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WORKMEN REMOVING ANCIENT PAVEMENT AT NIPPUR

The Pavement being removed was laid, or relaid, by Narâm-Sin, with bricks bearing his father, Sargon's, name, *c.* 2800 B. C. (?) Just above, 4 to 6 ft. thick, is pavement made by Ur-Engur, *c.* 2450 B. C. Above is pavement of Ur-Ninib, *c.* 2325 B. C. On top is the pavement of Kadashman-Turgu, XIII century B. C.

Photograph by Haynes. Courtesy of Dr. Albert T. Clay.

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OBJECTS AND METHODS OF ARCHAEOLOGICAL EXCAVATORS

FOR years past the race of the nations for the exploration of classical antiquity has been marked by such enthusiasm that science is yearly indebted to it for highly important and significant results. Indeed, scarcely a week goes by without a report of some new discovery being made in the course of excavations within the sphere of the early Roman Empire. Despite the fact that these investigations are being carried on with the greatest zeal on the part of America, and the excavations made by Americans during the last years have been a really striking success, the views of many people on the value and necessity of such work are still very vague, and questions as to the what, how, where, and why, of such excavations are continually being put to our antiquarians.

I shall now attempt to give an answer to these questions, as far as space and opportunity will permit.

Besides the written works of the ancients which have come down to us a number of actual objects dating from those remote times have also come into our hands, which supply us with much valuable information and supplement and explain the old writers, and in union with them unroll before our eyes a uniformly clear picture of antiquity, or, in so far as it is a question of works of art, they are to this day of the greatest value as unequalled models to our artists and artistic workmen. To increase the number of such antique objects, or where towns and buildings are concerned, to recover at least their founda-

tions, is naturally of great importance, as such new discovery opens up to us some new side of the life of antiquity, teaches us to understand our existent material better, and enables us with the aid of the inscriptions which are seldom wanting, to fill up many a gap in ancient history.

In comparison with what once existed, it is, of course, but extremely little that has been preserved through all the centuries, for the bad times of war, of general confusion, and decline in all spheres of learning, separate us from that great epoch of culture, and a great number of factors are ceaselessly endeavoring to destroy all that has been created by the hand of man.

What have been preserved down to our days are mainly works of architecture, which are lasting and strong enough to defy the tooth of time, and were protected by the people, as far as they were in constant use. Only in isolated instances have these buildings served the original purpose, down through the centuries, for which they were erected, as for example, that old lighthouse, gray with years, on the northwest coast of Portugal, which, erected in the time of the Roman Emperors, to this day, in darkness and in foggy weather, with friendly rays, points out the way to the passing ships. With the changes of time most buildings have also changed their purpose and have thereby at the same time, unfortunately, lost some of their originality. Temples were often converted into Christian churches and rebuilt according to the needs of the new cult. In later years some were even realtered in order to serve as mosques. In the Middle Ages the buildings of Rome were more or less transformed into fortresses, as the former tomb of the Emperor Hadrian, which is still a fortification. The great temple of Edfou was used as dwelling-houses, and up to a short time ago, a whole village was housed within its walls.

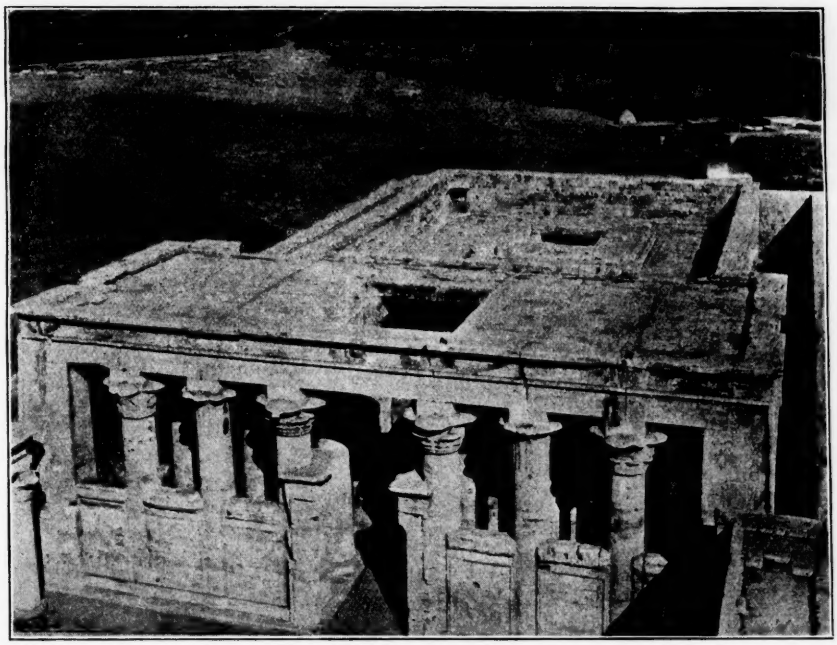
Of movable objects, too, indeed, even of works of art, a few were used again and again for some purpose or other, and so escaped destruction. Even in our day sarcophagi are used as baptismal fonts, as reservoirs, or even drinking troughs for cattle. A celebrated marble vase, the work of a considerable artist, served successively as an anchorage post for ships, and as a font. To-day it stands in the museum at Naples. The funeral urn of the elder Agrippina became in the XIII century the corn measure of the city of Rome.

The number of such articles which the people took under their protection and handed down through centuries, is, of course, not so great, and most of the antique things now preserved in our museums had in some way or other become buried under the earth, where they remained for a longer or shorter period in safe hiding, while centuries and peoples rush over them unheeded. But how do such objects get into the ground? the antiquarian is continually being asked, especially when it is a question of statues of considerable dimensions and the like.

It is a well-known fact that in inhabited places the level of the ground is continually rising. Every day new building materials are

being brought into the towns, but the rubbish that is taken out is not so considerable, consequently each new building stands somewhat higher than the one which preceded it. By each new paving the streets are raised a little and open squares and gardens grow still faster by reason of the falling leaves, sweepings, etc. In ancient towns, which had a great number of unpaved streets and squares, and where at times whole districts were destroyed by fire or sword and lay unbuilt for centuries, this so-called culture-stratum is, of course, much more considerable. [See Frontispiece.]

In this stratum or layer are found many things that were either thrown away and lost, or otherwise accidentally mislaid, and so



TEMPLE OF EDFOU, EGYPT, IN WHICH A WHOLE VILLAGE OF NATIVES LIVED BEFORE IT WAS CLEARED OUT

Photo by F. B. Wright

eventually got under the surface. Still richer in "finds" are the spots on which settlements once stood, which were suddenly destroyed and leveled to the ground by fire, sword, or earthquakes. The most valuable objects were, of course, not left behind, but nevertheless much remained lying under rubbish and ashes. By the action of the weather a layer of fertile soil was formed and a blooming vegetation soon grew over all, and nothing remained to show that the spot now visited occasionally by shepherds was once a flourishing village, until, perhaps centuries later, the favorable situation of the place induced other peo-

ples to settle down there, where, possibly, after a period of prosperity they suffered the same fate as their predecessors. Thus, for instance, in the course of Schliemann's excavations in Troy, quite a number of towns belonging to the most widely different periods and peoples, were found lying one upon another and still distinctly recognizable by what was left of them.

On the occasion of floods, too, many things have been carried under the earth, for when rivers destroy, they spread at the same time a covering of gravel and sand over the ruins, which is in some places of considerable thickness, as in Olympia and in the plain of the Eurotas. It is also sufficiently well known that at times whole towns have been destroyed or buried by volcanic forces, as at Pompeii and the numerous villages adjoining.

For perilous times, moreover, money and other valuables were often hidden away under the ground by anxious persons and many a one went down to the grave bearing his secret with him. Such treasure trove is by no means rare; at Hissalik, Vettersfelde, and Petrossa, in Roumania, for example, were found great treasures in gold, and at Boscoreale was dug up the famous silver "find," which is now the most prized possession of the Louvre Museum at Paris. Bronze treasure, too, which perhaps is to be regarded as the stock of some manufacturer, is awaiting its resurrection. Near Bologna, for instance, there were found 14,000 bronze utensils, for the most part enclosed in a single huge vessel. Even statues were buried, perhaps by the worshippers of the old religion, trusting in the return of the dominion of their gods.

But the richest and most numerous hiding places for smaller objects were the abodes of the dead, in consequence of the belief that human beings retained their daily needs even after death. Vessels are found in almost every grave. These consist chiefly of weapons and jewelry. Unfortunately, it was not always articles of full value which were given to the dead. Many things were especially made for this purpose, *e. g.,* shields of lead and wood, gold work of gilded clay, vessels without spouts, and such as were much too small, or otherwise of no practical use, worn-out household utensils, an earring, the mate to which had been lost; metal looking-glasses bent out of all shape, which distorted the face—the main thing was to satisfy appearances. But, for all that, the different contents of the graves are of no mean significance for the science of antiquity on account of their infinite variety and the number of the gifts.

In all ages it has come to pass that objects, which had lain safely buried for a longer or shorter period, have been discovered and brought to light by some happy accident. A thunderstorm rends the earth, a gale scatters a layer of sand, or some river sweeps away what is buried in the sand, and dumps it down somewhere on the bank, as was the case some years ago on the Alphcios, with a helmet which Hieron had dedicated after a victory at sea. The fact that peasants

are particularly lucky at finding treasures has already been mentioned by several writers of antiquity, and just the peasant working in the field has the best chance of doing so; a furrow is turned up a little deeper, a long waste piece of ground is made arable, or a mound opened up.

Near Portici, a well was being dug and the deposit of ashes covering Herculaneum was thereby disturbed, the catacombs were discovered by puzzolan-diggers, the celebrated find of silver at Hildesheim was brought to light quite by chance, during some operations at the shooting-stand there, and some time ago the ruins of the Græco-Roman town of Emporeon were laid bare by some workmen in the province of Gerona in Spain. In the course of more extensive operations, such as the construction of the Anatolian railway, for instance, chance finds are naturally very numerous.

In the beginning nobody but treasure-hunters ever thought of digging in the ground with a set purpose. This branch of industry flourished as far back as the time of the ancients, and to this day plays an important part in the Levant. Unfortunately, however, science but very rarely reaps any advantage from what is gained by the treasure-digger, working with his many superstitious arts. Should he find gold and silver, it usually finds its way into the melting pot, as do also very frequently the accidentally discovered hoards or treasures, if only from a fear that some superior, should it be only the cailif of the village, get wind of it and demand his share. Should, on the other hand, the dreamed of riches transform themselves into coal and ashes, that is to say, should the find consist only of a cinerary urn and a few vases, objects which they are at a loss what to do with, a kick from a heavy boot soon puts an end to their beauty. The number of statues and inscriptions, too, that have been destroyed by the treasure-hunters and ignorant peasants is not small. In the opinion of the Oriental the treasures are enclosed in the huge inscribed blocks, whose hieroglyphics he himself cannot decipher, and which are so carefully handled, cleaned, washed, studied, and photographed by us. The inscription is the "open sesame," and whoever is able to read it, can take possession of the treasure. But if the treasure is inside, the Oriental reasons, that then it must be got out in another way, and so he smashes the stone.

The tombs were, of course, the favorite hunting grounds, and even in the days of antiquity—as follows from Egyptian criminal documents and Greek romances—grave robbery was so very common we might almost say it was a regularly organized profession. Hence, it is that we very frequently find the ancient tombs already broken open, robbed of their most valuable contents, and the remainder in pieces. But these sherds do not always prove that the tomb has been broken into, for the clay vessels were frequently smashed at the burial to prevent the return of the deceased, or from another prevailing belief. For instance, the vessels were put into the tomb with the dead

man for his use in the other world, but the deceased did not exist any more only his soul, if we may call it so, and the soul, of course, cannot use the material parts of the earthly vessels, but only the spirit which still lingers there. The soul of the vessel, therefore, must be set free, the vessel must die—it is broken to pieces.

As for the excavations proper, that is, those which are carried out not for the sake of possession, but in order to ascertain and learn how things were in former times, they were begun at a much earlier period than is generally supposed. Even the Babylonian kings dug for the foundations and building plans of the ruined shrines of the olden time with the object of applying the old rules and regulations to their new structures. In the first few centuries of our era excavations were made in Palestine to discover the place of the crucifixion, the scenes of martyrdom, and the graves of prominent men. In Italy, at the beginning of the XII century, people began to take an interest in everything dating from the time of the old Romans, whom they regarded as their forefathers, and made researches in the ground for relics of the olden time. But these excavations and those of the same kind which were undertaken here and there during the Middle Ages were pure raids, the main purpose being to obtain as great a number as possible of movable objects. They did not trouble themselves in the least about the circumstances under which the objects were found, and nobody thought of turning them to scientific account. Hence it is, also, that we do not even know where many celebrated works of art were discovered, to say nothing of the accompanying circumstances. The statues, being only in very rare cases in perfect preservation, were furnished with arms and legs, and when necessary even with heads, and then served to adorn the gardens and villas of the aristocracy. By this process of completion, more or less clumsily executed, in which, as a rule, filing and polishing of the antique parts were included, much has been spoiled and many a work rendered valueless. It is scarcely necessary to mention that occasionally also little mistakes occurred, and the repairers whose workshops were crammed with antique arms, legs, hands, feet, and heads would sometimes place a masculine head on the statue of a woman, and vice verse, or transform a fighting warrior into a fallen one.

Predatory raids in which, in most cases, a great deal was destroyed, are now forbidden by law in nearly all countries concerned, but, nevertheless, they frequently occur in lonely and remote parts, as is proved again and again by the many antique objects cropping up in the art trade.

Archæological excavations, properly so called, are now carried on along definite, methodical lines. We seek not merely for separate objects, but consider the topography, plan, and history of the place in question at all the different periods of its growth and development. It is often not enough for us to excavate a single temple or theater, we lay bare entire towns with their streets, squares, and gymnasia,

their baths, libraries, and theaters, their temples, market-places, and factories, their shops, stores, and workshops, and it is no longer Pompeii alone that unfolds before our eyes a picture of the town life of antiquity.

All that we learn from a single one of these excavated towns cannot be told in a few words. Firstly, from the whole plan and style of building we can tell approximately when the town was founded, or whether there had always been upon the site in question a settlement dating from pre-historic times. From the further extension of the settlement we can see that it began to flourish after a certain time, and the course of this growth is, as a rule, not hidden from us. We are hereby able, with the help of the ancient writers, to bring the town into historical and educational connection with other towns and states. Their political significance is deducted from inscriptions; and from the number and splendor of the public buildings, temples, theaters, baths, etc., the prosperity of the community. The quality of the buildings, statues, and other works teaches us in what relations the inhabitants stood to art, whether they followed their own direction in art, had at their disposal their own creative and executive artists, or whether they imported their art. If so, from where, and, furthermore, whether they had enough artistic sense to develop and improve this imported art, or if it starved or ran wild under their hands. We learn something, too, concerning the life of the inhabitants, both in their business intercourse and private life. The sale-rooms, market-places, and shops appear equally distinct. Here dwelt a baker, there a draper, and at this corner there stood an inn. We go into the business rooms and see the arrangements and measures which were necessary to every trade, in some even we find the very tools. In the same manner we learn to know the private houses in their ground plan and structure, with their courts and pillared halls, their state-rooms and gardens, their living rooms and kitchens. Not one side of this antique life is overlooked during such excavations; everywhere we find scattered signs from which we are able to make deductions in this direction or in that.

Such comprehensive excavations, which occupy several years, are, of course, only in very rare cases, undertaken by a private man at his own expense. Scientific research societies, the more important museums, or the state itself here step in, and with sufficient funds carry out the operations on a grand scale, under the guidance of archæologists, assisted by epigraphists, architects, geometricians, etc.

Before beginning such excavations it is necessary above all to find out the right place in which to set the spade, and for this a little luck is needed; however, one will scarcely begin an excavation entirely at hap-hazard without any signs or traces whatsoever to indicate the presence of antique relics. It is chiefly the ancient writers who show us the way, and in union with them the relics which exist to this day. Of ruined towns, great shrines, castles, and fortresses something—

were it only a miserable bit of wall—has been preserved in many cases throughout the centuries, and has still remained visible. Thus at all periods the royal castles of Tiryns and Mycenæ, and the sites of Olympia and Delphi, of Ephesus and Miletus have been known and recognized. But it is more difficult when we have to rely only upon the accounts of traditions, in which, in some cases, the situation of a shrine, or a temple, is accurately described, but often is only casually mentioned or vaguely designated. In such circumstances we must work upon other criteria, and every detail is given significance. The character of the landscape, the nearness of water or mountain peak, the capabilities of defense of the place, etc., are to be carefully noted, the present name of the village, the names of the brooks and rivers, and above all, any antique objects which may have been discovered by the inhabitants—sherds, terra cottas, vases, inscriptions, stones from buildings, etc.

All these appear to indicate that we have before us the site of an ancient settlement, which we make certain by an experimental research, a few trenches are drawn across the ground in question, and then we have a fair idea whether or not a systematic excavation would result in the hoped-for success.

When we now, after the more theoretical explanations, enter upon the actual work of the excavators themselves, we find that the preparations and practical work demand a much greater outlay of time and trouble than may appear at the first glance. Privations of all kinds await the excavator, though, indeed, there are not wanting incidents of the merriest and most amusing kind to keep up his spirits in lonely times.

Having chosen an excavating field, the next thing to be done is to obtain the consent of the government authorities in whose district the excavator intends to dig, and tedious diplomatic negotiations are sometimes necessary before everything is settled, and the digger's share of the finds definitely fixed. According to the laws of some countries, the finder has only the right of scientific exploitation, *i. e.,* the right to photograph, and, perhaps, take casts of the objects discovered, and to publish the results. In other countries we are treated more favorably and receive, for instance, one-third, or if we are the owners of the ground even two-thirds of the whole find.

The lands where one can work the whole year through are rare. It is partly the climate, and in no small measure the malarial fever from which our scholars in southern countries have to suffer so much, which calls a preëmptory halt; partly, also, the local circumstances which necessitate the breaking off of the operations for some length of time, if only on account of the laborers, who are needed for the harvest and field work.

When the time comes for beginning the excavating campaign, you take leave of civilization for a length of time, and repair to the scene of future discoveries. Some foremen have been engaged and

ARAB WOMAN GRINDING CORN IN NATIVE CAMP AT NIPPUR, DURING THE EXCAVATIONS
Courtesy of Dr. Albert T. Clay

sent out in advance with the baggage. These overseers are mostly picked and experienced fellows, who, in many cases, have already taken part for years in excavations in the service of different nations. They acquire in the course of time a certain experience in archæological matters, understand perfectly how to manage the workmen and know the habits and needs of the archæologists, so that they are everywhere indispensable.

Having reached the scene of operations, the first thing to be done is to find lodgings. There is very seldom a hotel in the neighborhood, or any place where tolerable quarters can be arranged. Should the researches be of presumably short duration, one simply puts up with what offers. Last summer, I, myself, lived for weeks in a hay-loft, slept on a wooden chest, and felt very well all the time. It is, of course, more comfortable to live in tents, especially when a number of scientists have to be accommodated. The chief tent, which is used both as office and dining-room, stands in the center, to the right and left of it are the sleeping tents, the tents for measuring instruments, photographic cameras, and valuable working tools and utensils. The less costly instruments, such as baskets, rollers, levers, and the like, lie outside, one of the foremen being responsible not only for their loss, but also for keeping them in order. Behind the main part of the camp lie the kitchen quarters. There is the kitchen itself, a magnificent structure, built of rough stones collected somewhere in the neighborhood, kept together with clay. The roof is made of rushes or straw, or

whatever happens to be at hand, and if any one chance to have a spoilt photographic plate, it is put in for a window. A similar den is erected for the servants. Should the roof be a tarred one and generosity have been shown in the matter of old photographic plates, such a hut will be the pride and boast of its inmate. "Have you ever slept in a castle?" was, for instance, the question put by the little serving-man to the cook, when they moved into their quarters on the occasion of some excavations by the Oriental Society in Egypt.

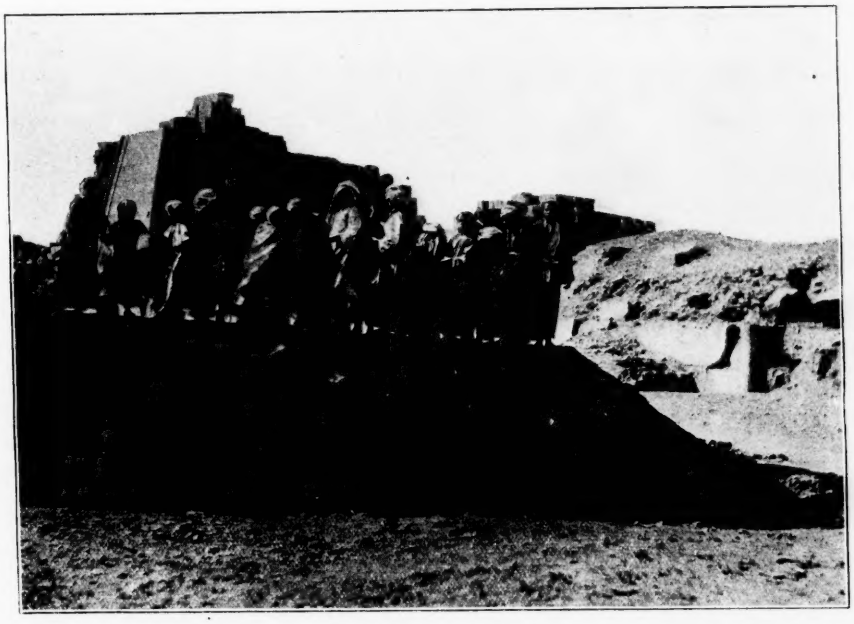
Near the kitchen are usually the zoological gardens of the expedition, which are divided into a domestic and scientific section. The domestic section contains the horses and donkeys, when they are needed, and poultry, ducks, geese, etc., in large numbers—before feast days, even a sheep. In the other more interesting division are to be found the various characteristic animals of the country, jackals, wildcats, owls, and other creatures, many of which cut short their unwilling visit by finding out some means of leaving their improvised cages, which are frequently much too frail.

When the scene of excavations is remote from civilization, say in the far East, a guard room must be added, as constant post for the military escort.

But as the climate of the country does not permit of living in tents for the entire duration of the excavations, it is advisable from the very commencement to erect one's own excavation-house, more especially if there is a prospect of their occupying it a number of years. This building may be made so solid and firm that after completion of the excavations it can be kept up at a trifling expense and serve as quarters for visitors to the ruins.

At daybreak the work begins. The people, most of whom have already come a long way, are called over and place themselves with their hoes and baskets in rows of 10 or 15 by the side of the caller. When the column is complete, they march with their overseer at the head to the scene of operations, and the work is soon in full swing. When lorries are employed the boys are very busy filling the cars with baskets, which are handed to them by the man with the hoe. If there are no lorries the basket-carriers may be seen marching in long rows, carrying away the rubbish. One, sometimes two, men are constantly occupied in repairing the broken baskets, while boys have the task of supplying the men with drinking water. On hot days this is hard work; they are wanted everywhere, called everywhere, and have to drag about incredible quantities of the noble beverage in the course of the day. Of course, if the well or spring is some distance off, the carrying is done by a horse, the so-called "water-horse," or a donkey, and the "water-boys" have only to distribute the drink.

The men work very industriously as a rule, the overseers take care of that, now and then shouting a vigorous "forwards!" and when the whistle sounds for leaving off work, woe to the boy who dared to throw away his basket at the first sound of the whistle. The basket is



NATIVES AT KARNAK, EGYPT, CARRYING AND DUMPING DIRT FROM THE EXCAVATIONS Photo by F. B. Wright

first tidily emptied, then all are placed together and counted. Lazy and disobedient workers are punished by deductions from their wages, while good work is acknowledged by gratuities. Now and then it happens that some one asks leave for 10 or 20 days. Either he wants to get provisions, for which he has to travel from 3 to 5 days, the same length of time being needed for bargaining, or he wants to get married, or to build himself a house. There are also some people who desire to rest on their laurels and fairly earned fortune, and who think when they have worked faithfully for a few months and earned a good sum they must retire on their riches, and with $20 or $30 in one's pocket one can live like a lord for some time in the Orient.

For the archæologist there is, as a rule, no want of variety in the work; now there is this and now there is that demanding the personal presence of the leader. Here comes an overseer rushing up, "Come, sir, and look at the boy he is bleeding." Some slight injury has occurred, which generally passes over without any series consequences, but occasionally also it may cause some little annoyance. Thus, for instance, one day immediately after dinner time, the head overseer came to me in the "working room," as my dwelling was officially called: "Come quickly, sir, they have all stopped work!" And truly the workmen were crowding by, making for their tents, and on the field of labor I found only a few left, who were able to explain the why and where-

fore to me. The story went that a stone had struck one of them on the head with such force that he collapsed and lost much blood, and this being a bad omen, the work was immediately stopped. I began to fear that the men would not return to the work at all and we should be obliged to secure others in the more distant villages. But the patient recovered quickly and the next morning at roll-call not a man was missing except the patient himself, who sent a "cousin" as his substitute.

It is more pleasant when it is reported that a tomb, for example, has been struck. The case has to be carefully handled. The workmen receive a special gratuity for the find, but are then disbanded, and the select or elite troops are called in. These being a better paid group of old, trained, and trustworthy persons, are employed for especially difficult work and posts of trust. By these men the tomb is now laid bare and cleaned out. If the work cannot be accomplished in one day, a little tent is put up over night, in which two or three men have to keep watch. As an extra spur to their vigilance, an old blunderbuss is given over to them. It is, of course, unloaded, but they are extremely proud of it.

There is everywhere and always something to be done; besides, reports of the finds have to be written, wage-lists, account-books, etc., kept. Only Sunday, in Mohammedan districts Friday, brings some rest and leaves time for excursions, for shooting, or visits to the dignitaries of the surrounding villages. On high holidays the whole village comes to pay a return visit. Coffee and cigarettes are handed around, and the whole company, the chieftain of the village, the magistrate, the night watchman, etc., squat on the ground and declare solemnly that all the people in the village are good, that thieves are to be found only in the neighboring village, and that they are especially attached to the Americans, etc.

The field of excavations displays quite a different picture when the end of the campaign approaches. Everywhere there is thumping and hammering going on, big chests are being made for the finds, the tents are taken down, and the buildings bolted and barred; tools are packed up or stowed away in the buildings, the draught-oxen are being brought up to carry away the big chests on drags or carts, camels and donkeys are being loaded, everywhere the liveliest activity prevails. After a little all have withdrawn, the workmen have gone back to their villages, the archæologists to civilized life, calm, and forsaken lies the field, recently so full of life. only high up in the air big brown eagles are gyrating in wide circles, ready to pounce upon the creatures which are slinking about the exhumed ruins and striving to settle there.

AUG. KOESTER.

Königliches Museum, Berlin, Germany.

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1. TRIBUTE MONEY. 2. HEAD OF GODDESS ARETHUSA, OF ANCIENT SYRACUSE

RELIGIOUS CHARACTER OF ANCIENT COINS

THE order of the President to omit the familiar inscription, "In God we trust," from the new $10 gold pieces, has awakened all manner of criticism, and the tremendous outcry of individuals and the condemnatory resolutions of churches and conferences. It recalls a similar hostile attitude developed in England some years ago. Many Christian and religious types had been introduced on the coins of Europe since the days of Constantine the Great, and Richard II placed the inscription: "Dei Gratia" on the English coinage, but when it was omitted from the silver florin of 1848-9, and a new type substituted, there was a storm of opposition that resounded throughout all England—and doubtless the transgressor often regretted his act of indiscretion. President Roosevelt has never been charged with irreligious motives in ordering the religious inscription omitted from the new coin, and yet many of his greatest admirers have regretted what they regard as a hasty and ill-advised action, and feel that for the sake of the universal religious sentiment of the people, it would have been policy, at least, not to have removed the ancient landmark. Although the "Dei Gratia" was not restored, it is not unlikely that "In God we trust" will find a place again on the $10 gold piece long before the die is worn out. As far as I am personally concerned I have no choice, for the truth expressed in that inscription is just as real to me, whether stamped upon our coins or not, but so far as the people are concerned, I hope that they will not be denied any of the blessings that such a national religious faith expressed on our coins may bring to them and to their children, and I am sure that our foremost American, and most conscientious President, would deprive no one of such a heritage.

In view of the wide discussion and the general interest shown, it may be profitable and interesting to the readers of the RECORDS OF THE PAST to give a brief survey of certain features of the religious char-

COIN WITH MARS VICTOR

acter of the coins of the ancient Greeks and Romans, from the early history of coinage in the VII century B. C., through a period of 1,000 years.

The science of numismatics abundantly shows that man is a religious being, for the coins of Greece and Rome prove that their religion was as inseparable from their money as from their daily life, for all their best works in art and literature were consecrated to the gods whom they revered.

Hence the presence of a religious inscription on a coin is no modern innovation, and without historical precedents, but from an early date, through centuries, the Greeks stamped the familiar representations of their deities upon their coinage. Nor was it strange that a religious people should have associated their religion with their money, for their purpose was to keep before the people the actual gods whom they held to be the founders and patrons of their cities and the inspirers of their best works.

It is generally believed that the earliest coins were struck within the sacred precints of the temple, and this view is in harmony with the early representative character of money, and also the fact that in early and insecure times the temples were the safe and inviolate places for the rich treasures stored therein. When the transition came to convert the bars and wedges of electrum, gold and silver into coins, how natural that the mint should have been established in the same place, under the direction of the priests and representatives of the state and the supervision of the gods, whose images the coins bore, as a guarantee for their genuine character. In fact, the very word money is derived from the temple of Juno Moneta, in Rome, for within its precincts the public mint was established, and it is but natural to suppose that the Romans adopted this idea also from the Greeks.

Just as the history of the Greeks and Romans is inseparably connected with their religion, in like manner was their money identified with their religion, bearing the images and superscriptions of their gods and goddesses. The effigies or symbols of these were stamped

COIN WITH PORTRAIT OF ALEXANDER THE GREAT

upon the gold, silver, and bronze coins, so that their vast pantheon is represented in a variety of religious types on the money that circulated for domestic and national use, containing the familiar images of Zeus, Saturn, Neptune, Mars, Mercury, Apollo, Hercules, Vulcan, Juno, Venus, Diana, Cybele, Athene, Arethusa, Astarte, Persephone, Apis, Anubis, etc.

These images of their deities served as guardians of the genuine character of this all-important medium of exchange, and appeared as a guarantee that the money was of the required weight and purity, for the monetary heresy of recent times had not led their people to believe, even during a political campaign, that 50 cents worth of silver was equal to 100 of gold.

The coins were generally stamped with the image of the local guardian deity, or else with the recognized symbol of that deity, just as the coins of Athens bore the effigy of Pallas and the owl, the symbol of that goddess. Thus, on a coin of Claudius and Agrippina, we have preserved one of the very best extant copies of the famous and much venerated image of "Diana of the Ephesians;" whose zealous followers opposed the work of the Apostle Paul in their city. As that same image appears on a coin of Philip, the Arab, we may conclude that the worship of the many-breasted Asiatic nature goddess prevailed in Ephesus at least two centuries later.

So scrupulously guarded was the religious character of the coinage of the Greeks in placing the images of their deities upon their money that it was not until after the death of Alexander the Great that the effigy of a human being received this distinction. Nor did Alexander himself, with all his overreaching worldwide ambition, presume to usurp the place reserved for the gods by placing his own image there, for though he was a supplanter of kings and the rulers of earth, he did not attempt to supplant deities. He did dare to discard from the face of his coins the well-known effigies of the hereditary gods Æres and Apollo, and substituted those of Pallas, Herakles, and the Zeus of Olympia, but he refrained from introducing his own. It was not until after he had completed his brilliant earthly career and passed from the eyes of men that his apotheosis took place, and when

dazzled by his seeming superhuman achievements the people assigned him a place among the gods, it was only a logical sequence that Lysimachus and Ptolemy gave him the supreme and divine distinction by placing his somewhat idealized portrait upon their coins, although Pallas was retained on the reverse of the former and Zeus was enthroned on the reverse of the latter, so that the gods still retained their ancient seats upon the money.

Whilst the apotheosis, or elevation of Alexander the Great to a place, hitherto reserved for deities, was an innovation in history, yet the process was a gradual one achieved through years of brilliant conquests that seemed to justify his bold claim to be the son of Zeus Ammon, and this made his ascendency to a place among the gods quite natural, hence the people found no fault when they saw his portrait on the *tetradrachma* substituted for the long familiar Libyan god.

From this period begins a long and interesting portrait gallery of many of the rulers of the Greek world, whose images occupy the obverse of the coins, whilst the reverse is generally reserved for the effigies or symbols of the deities.

The same custom was followed by the Romans, who stamped their coins with the portraits of rulers and distinguished women of the court, but on the reverse they often gave place to the effigies and names of their gods and goddesses. So general was this custom of stamping the Greek and Roman money with religious types that the half-shekle became a necessity for the maintenance of the temple at Jerusalem, and no wonder that the priests refused the current money for the sacred tribute of the sanctuary, and obliged the people to have it exchanged for half-shekle, which was free from all pagan devices. In commercial value it was identical with the two drachma, or the two denarii that were current in Palestine, but to have put money containing the images and symbols of pagan gods into the treasury of their holy temple, erected to the worship of one god, would have been sacrilege to the faithful Jews.

It was a grievous calamity that befell the Jews when their city and temple were destroyed in the year 70, but a gross insult was added to that injury when the Emperor Vespasion and his successors for many years imposed upon them a special tribute for rebuilding and maintaining the temple of Jupiter Capitolinus in Rome. The emperor ordered the Jews, in whatever country they might be, to pay for this purpose the sum of two drachma, or two denarii, the equivalent of the half-shekle that they had hitherto paid to the support of their holy temple in Jerusalem. To the pious Jew this was enforced idolatry, and many were the efforts at times to escape it.

We can easily understand what a shocking outrage this must have been to the religious sensibilities of the grieviously oppressed Jews, who, suffering from the loss of their temple and worship, were now forced to do what seemed like the very climax of sacrilege, to contribute to the support of a temple and its worship, the very name

of which was an abhorrence to the Hebrews. That temple of Jupiter, on the Capitoline Hill, seems to rise again from the wrecks of the distant centuries, and gives us vivid and realistic impressions of the political and religious state of the Jew in his relation to the Gentile world, as we study one of the coins of Vespasion, Titus, or Domitian, that bears an excellent representation of this most venerated building in Rome for the Romans, but the most profane to the faithful Hebrew. But how different this coin appeared to the religious consciousness of the oppressed Jew as he looked upon it; for it was inseparable from the saddest associations and many suffered shameful humiliations from the severe and revolting measures enforced by Domitian. On the accession of the humane Nerva, however, the most disgraceful usages and malicious preversions of justice in gaining the necessary information for imposing the tax were abolished. The Roman Senate struck a special coin on which they commemorated this noble act, thus making it a most interesting historical monument. Nothing makes those distant times so real and brings them so near as when I study attentively these cotemporaneous coins, for they are also cotemporaneous and unrevised monuments.

I have another most interesting coin that shows the humiliating and oppressed condition of the Jews after their disastrous efforts to throw off the Roman yoke under the leadership of Bar Cochebas. That unsuccessful endeavor, from 132-135 A. D., involved his own race in the greatest misfortunes. The Jewish power was crushed. They were forbidden to enter the city of Jerusalem on pain of death, and in shameful contempt for them a figure of a swine was placed over the Bethlehem gate. We can easily realize this fact when we examine a coin struck by the Tenth Legion Fratensis at Jerusalem, where Titus originally stationed them to guard the place after the destruction of the city, for on that coin we have a confirmation, in the figure of the swine and the letters, "L. X. F." stamped upon it. Imagine the feelings of a Jew paid in such money! There were other types no less offensive to him, but often there was no alternative, for money was a necessity.

The early Christians were embarrassed with the same religious character of the money, for they were obliged to use for the most sacred purposes of their holy religion the gold, silver, and bronze coins of imperial Rome and Greece that bore the images and types of a pagan mythology which they repudiated. They cherished a different faith, as the Apostle Paul wrote to the Christians in the Church at Corinth: "There is no God but one. For though there be that are called gods, whether in heaven or on earth; as there are gods many, and lords many, yet to us there is one God, the Father, of whom are all things, and one unto Him, and one Lord, Jesus Christ, through whom are all things, one through Him." It must have been a great joy to the Christian Church, when, after the accession of Constantine the Great, they saw the labarum and symbols of Christ appear on the

imperial coinage, but their hearts must have sunk again, when later, his nephew, Julian the Philosopher, in his zeal to restore paganism, supplanted the Christian symbols with pagan devices, and placed on the money the figure of Apis, banishing every suggestion of the cross and of that religion so dear to the struggling church. And how suddenly that sorrow was turned into joy, for with the death of Julian, Jovianus ascended the throne and the image of Apis disappeared, and the symbols of Christ appeared again on the coinage of Rome. I do not mean to convey the impression that in the instances named the cross appeared on all, but rather on a few types, and yet that was an imperial acknowledgment of Christ.

There is an exceedingly interesting coin, especially to the student of the New Testament. It is the coin of the proconsul Proclus, struck on the island of Cyprus, during the reign of Claudius. On this coin we have a remarkable and important confirmation of the accuracy of the writer of the Acts of the Apostles. For more than a century many of the leading critics of France and Germany denied the historical character of St. Luke's statement in Acts xiii: 12, wherein he calls Sergius Paulus, the ruler at Paphos, a deputy or proconsul. The ground of the objection was that a proconsul was appointed by the Senate, and only to provinces where no military force was required, and as they contended that a military camp existed on the island at that time, the ruler could not have been proconsul, but a proprætor, or procurator appointed by the emperor. The long and bitter controversy that impeached the accuracy of the sacred narrative was suddenly brought to a close by the discovery of 3 coins struck on the island, during the reign of Claudius, bearing his portrait on the obverse, and on the reverse the name of the local deputy, Cominus Proclus, with the title of proconsul ἀνθύπατος,—the identical Greek word employed by St. Luke, and as St. Paul visited Cyprus during the reign of Claudius, it was settled by the coin that Sergius Paulus was a proconsul, and Cyprus was at that time a senatorial and not an imperial province.

The coinage of the subsequent Christian centuries bears many examples of sacred symbols and effigies, and the history of early Christian numismatics shows considerable variation of religious sentiment as expressed on the current coins. At times there is merely a symbolic representation of the cross, or initial letters, and then again an image of the Saviour. Justinian II, who was guilty of many crimes, has, perhaps, his strongest, but not enviable claim of being a Christian, in a cotemporary numismatic monument, for on a gold solidus he put the bust of the Saviour, and on the reverse, a full length portrait of himself, grasping the cross as the symbol of his faith.

Then succeeded the iconoclastic dynasty, when the effigies of Christ were excluded from the coins. In time the sacred effigies appeared again, and Leo the Philosopher and Leo of Basil was the author of a marked innovation, for he placed the bust of the Virgin

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1. COIN OF ATHENS. 2. QUEEN PHILIOTIS, WIFE OF HIERO II, OF ANCIENT SYRACUSE—FIRST PORTRAIT OF A WOMAN TO APPEAR ON A COIN, C. 250 B. C. 3. DIANA OF THE EPHESIANS.

Mary with the legend, Mary—ΜΡΘΥ=Mary, Mother of God, showing a new movement in theological thought, which reached its climax in this legend placed upon the coins of Romanus Diogenes, 1065: "O, glorious Virgin, he that trusteth in thee prospers in all things." This petition appears on the besants of Alexius: "Help us, O Lord!"

To trace this subject further would be to exceed the limits fixed for this paper, and I shall close as I began. Whether the inscription: "In God we trust" be retained is immaterial, for I am confident that the religious faith and character of the people will be in no wise affected, for the belief expressed in that legend was ineffacably inscribed upon the human heart long before the Asiatic invention of coins by the Libyans. Though all religious inscriptions should be omitted from the coinage of the world, the people would still continue religious, for man is essentially a religious being, and the science of religions shows that no race of men has ever been discovered without religion.

I recall an interview with the great French archæologist, Maspero, and a statement made to the writer in the Cairo Museum, when he spoke of the almost universal religious character of the monuments and inscriptions discovered in the valley and boundaries of the Nile, for he declared that the number and proportion were so great that one might almost conclude that ancient Egypt had been mainly peopled by the gods, and had only animals and men enough for sacrifices, and to attend to worship.

To ask, why is man a religious being, we might as well ask why does man think, why does he love? Man is a thinker and there is something for him to think about. Man loves for there is much to love, and the God who made him is love. In like manner the universal nature of mankind responds to the Infinite Spirit and Absolute Being, the Creator of man, and in whom we live and move and have our being.

The importance of retaining the inscription on the $10 gold piece, or not, will depend largely upon the point of view of the individual, but no sane man will refuse to accept our gold eagles should that legend be omitted. The President acted from conscientious motives, and whether or not he erred in judgment, no one need imagine a national calamity so long as we have men like himself at the head of the nation, who love righteousness and fear God. It is all important that the faith expressed in that inscription should ever be retained in the hearts of all the people.

JEREMIAH ZIMMERMAN.

Syracuse, N. Y.

COIN WITH HEAD OF ZEUS

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THE INFLUENCE OF THE GLACIAL EPOCH UPON THE EARLY HISTORY OF MANKIND*

WHEN, in 1859, Doctor Falconer, Professor Prestwich, Sir John Evans, and Sir Charles Lyell, with some other English geologists, returned from a visit to Amiens and Abbeville, in the valley of the Somme in northern France, and reported their acquiescence in the genuineness of the discoveries by Boucher-de-Perthes, of rough stone implements in connection with the bones of *Elephas Primigenius,* and other extinct animals, in the "high-level" gravels of the Somme, a great sensation was produced in the scientific world. For, as was fully shown by Sir Charles Lyell, in his work upon the *Antiquity of Man,* published in 1863, these dis-

*Paper read before the Victoria Institute, London.

coveries, and other similar ones, made in different parts of France, and in southern England, involved the existence of man during the continuance of the Glacial Epoch. Innumerable subsequent discoveries, both in Europe and America, have confirmed this conclusion, and the existence of glacial man has been very generally accepted.

One of the chief reasons for the general public's hesitation to accept the evidence for glacial man arose from the then prevalent opinion that the glacial epoch closed about 100,000 years ago, and, therefore, that the acceptance of glacial man involved an enormous antiquity for the human race. At that time Lyell's uniformitarian theory concerning geological movement was scarcely questioned by any, and it was deemed legitimate for geologists to make unlimited demands upon the Bank of Time. An interesting illustration of this is found in the calculation made by Charles Darwin in the first edition of his *Origin of Species,** where he estimated that a limited amount of erosion of the geological deposits in southern England must have occupied 306,662,400 years, which, he says, is a "mere trifle" of geologic time. Indeed, the uniformitarians generally regarded such a period as 500,000,000 years as a convenient thing to conjure with, while Sir Andrew Ramsay and others** maintained that for all we could tell geologic time was absolutely limitless.

But since the publication of the first edition of *The Origin of Species,* and of Lyell's *Antiquity of Man,* there has been a startling revolution in the opinion of scientific men concerning the age of the world and the length of geologic periods. In the later editions of *The Origin of Species,* the calculation above referred to has been omitted and a paragraph inserted in its place, making some very pertinent remarks about the inadequate conception which most men have of the significance of even one million years, and of the changes which would take place during that period, even at a very slow rate. Sir Archibald Geikie emphasizes the point by calling attention to the fact that if a river lowers its bed by erosion 1 ft. in 1,000 years (which certainly is a very slow rate), it would produce a gorge 1,000 feet in depth in one million years. Such rivers as the Colorado, in America, are entirely competent to have eroded a cañon 6,000 feet in depth in one million years. Indeed, on every hand evidence is multiplying of the great activity of the forces which produce changes in the earth's surface and in the species of animals and plants which live upon it.

It was Prof. George H. Darwin, who first demonstrated to the satisfaction of his fellow mathematicians that the moon was thrown off from the world not more than one hundred million years ago, and, therefore, that the geological ages whose history is studied in the stratified rocks of the earth, must be compressed within that period. Later, Lord Kelvin has voiced the pretty general belief of his asso-

*See pp. 250-252.

**See Lord Kelvin's Annual Address at the Victoria Institute, 1897.

ciates in maintaining that twenty-four million years is all the time which geologists can have at their disposal. With him, Alfred Russell Wallace is in substantial agreement, maintaining from the rate of probable deposition of geological strata that thirty millions years is really all the time that geologists require.

The approximate correctness of these recent calculations cannot well be doubted, since they rest upon very substantial data, from which speculative considerations are largely eliminated. Professor Darwin's calculations are based upon the known influence of the tides in retarding the revolution of the moon upon its axis, while Lord Kelvin's confident assertion rests upon the known laws governing the radiation of heat from the solar system, and Wallace's conclusions are largely derived from the new light which recent studies have shed upon the rate of erosion, which is going on upon the surface of the earth at the present time. Extended and careful investigations show that the Mississippi is depositing sediment in the Gulf of Mexico at a rate which would require the removal of 1 ft. of soil from the entire area of the Mississippi basin, stretching from the Rocky to the Alleghany Mountains, in less than 5,000 years. This would lower the level of the whole American continent 200 ft. in 1,000,000 years. If this process continues without interruption not much will be left of North America after 3,000,000 or 4,000,000 years. Other river systems are much more active on account of the steeper gradient of their channels. The Po, for example, is lowering its basin at the rate of 1 ft. in 700 years.

It is true that geologists have not readily accepted these narrow limits imposed upon them by the astronomers and physicists, and they are attempting by various lines of argument to obtain an extension of credit to the extent of 100,000,000 years or so. But even with such an extension the case is very different from what it was when 306,000,000 years could be spoken of as a "mere trifle." In the readjustment of the ratios of geologic periods, under these new limits, the glacial epoch is brought down to comparatively recent time.

Dana's estimate of these ratios are twelve for the Palæozoic period, three for the Mesozoic, and one for the Cainozoic, which includes the whole of Tertiary and post-Tertiary time. If we accept Lord Kelvin's estimate of the whole time at the disposal of geologists, these ratios would give us 18,000,000 for Palæozoic time, 4,500,000 for Mesozoic, and 1,500,000 for Cainozoic time, while post-Tertiary time, which includes both the glacial and post-glacial epochs, is probably not more than one-thirtieth of the Cainozoic period, which would be 50,000 years. But even if this is doubled, and 100,000 years is allowed for it, the post-glacial period, which is certainly not more than one-tenth as long as the glacial, would be only 10,000 years.

We are, however, not dependent on speculative calculations alone to bring the close of the glacial epoch down to so recent a period that it is injected far into that of human history. Within the past twenty-

five years, innumerable data have accumulated in America to prove that the ice of the glacial epoch lingered over the northern part of the United States, as far south as the 43d degree of north latitude, as late as 7,000 years ago. This evidence is so clear and of such a varied character that it cannot be resisted when once it is clearly understood.

The evidence naturally falls under five divisions:

1st. The small recession of post-glacial waterfalls.

2d. The small enlargement of post-glacial river valleys.

3d. The limited extent to which post-glacial lakes, ponds, and kettle-holes have been filled with sediment.

4th. The small amount of the subaerial erosion of the surface of limestone rocks in post-glacial time; and

5th. The identity of the flora of glacial with that of the present time.

1st. In America, at least, nearly all the waterfalls are in the glaciated region, and have been produced by the damming up of pre-glacial water-courses with glacial debris, so that the drainage is diverted into new channels, where we can estimate the amount of erosion which has taken place since the withdrawal of the ice. The Falls of Niagara and those of St. Anthony, in the Mississippi River at Minneapolis, are among the most spectacular of the instances at our command, but they are by no means the only ones. The waterfalls in the United States, which have been produced by obstruction of the pre-glacial drainage by the irregular deposit of glacial debris, are numbered by the thousand, and everywhere illustrate the limited amount of work accomplished by streams since the glacial epoch. But in none can calculations be so easily made as in the cases of Niagara and the Falls of St. Anthony.

In pre-glacial times the drainage of the Lake Erie basin followed a channel leading to the head of Lake Ontario, forty or fifty miles west of the Niagara. This had been occupied for such an enormous period that the Lake Erie basin was drained to its bottom, and whatever cataract had formerly existed had entirely disappeared, and there was an uninterrupted channel from one basin to the other. During the glacial epoch this channel was filled with glacial debris, or boulder clay, so that it was completely obstructed and the water diverted to its present channel. But the drainage of this basin could not resume its eastward flow to the Atlantic Ocean until the glacial ice obstructing it had retreated from the Mohawk Valley in the central part of the State of New York.

The difference between the levels of Lake Erie and Lake Ontario is, in round numbers, 325 ft. (Lake Erie being 575 ft. above tide, and Lake Ontario 250 ft.), but the coll at Rome, N. Y., leading into the Mohawk Valley, is, in round numbers, only 100 ft. above Lake Ontario. Until, therefore, the ice had retreated from this coll

at Rome, N. Y., there could have been no eastward drainage from the Great Lakes, but as soon as it was removed the renewed eastward drainage could begin, and the Niagara River would commence the erosion of its gorge where it plunged over the escarpment at Queenstown. The time required for the erosion of this gorge between Queenstown and the present cataract represents the time which has elapsed since the ice of the glacial period retreated from the central part of New York, between the Adirondack and the Catskill Mountains; while, over the lower St. Lawrence Valley, and, indeed, over nearly all of Quebec and Ontario, it must have lingered to a much later date. The problem, therefore, is to find the age of the Niagara gorge. Until recently this was largely a matter of conjecture, but now our calculations may rest upon a solid basis of observed facts.

The length of the Niagara gorge is, in round numbers, 7 miles, or 35,000 ft. The strata of rock through which it is cut are of very uniform composition. At the surface we have a stratum of compact Niagara limestone, 25 or 30 ft. thick, at the mouth of the gorge, but between 70 and 80 ft. at the present cataract. Underneath the Niagara limestone very uniform strata of Niagara shale, about 80 ft. thick, extend through the whole distance. It is this relation of the soft beds of Niagara shale to the overlying stratum of compact limestone which occasions the cataract. The back lash of the plunging water erodes the underlying shale and leaves projecting masses of limestone, over which the water falls in perpendicular descent. From time to time these masses of projecting rock fall to the bottom, so that the edge of the cataract is made to retreat. But the volume of water is so tremendous and its fall so great that the largest masses of rock are moved by it, and, being rubbed together by the motion, are gradually reduced to powder, and carried away piecemeal, leaving the base of the fall unencumbered.

Underneath the Niagara shale there are four other persistent strata of alternate hard and soft character. The Clinton limestone is about 30 feet thick and very compact, but it rests upon about 70 ft. of shaley rock, which is easily disintegrated. This Clinton shale, in turn, rests upon a stratum of compact Medina sandstone, 20 to 30 ft. thick, and that upon a shaley rock reaching to the water's edge. All these strata dip slightly to the south toward the cataract. Owing to this dip and to the gradient of the stream, all but the two upper strata disappear below the level of the stream a little more than half way to the cataract, so that practically our problem involves the simple question of the erosion of the 35,000 feet of the two Niagara strata.

In 1841, Sir Charles Lyell visited Niagara, and from a hasty examination published a random guess that the rate of recession did not exceed 1 ft. a year, and probably was not greater than 1 ft. in 3 years; according to which the beginning of the erosion of the gorge must have been as far back as 35,000 years at least, and probably 100,000 years. Unfortunately, these figures have passed into the literature of

the subject, and, owing to Lyell's great authority, have been accepted as scientific facts. But Sir Charles was himself very far from regarding them so; for, at the time, he urged Prof. James Hall, of the New York State Geological Survey, who accompanied him, to make an accurate trigonometrical survey of the crest of the Falls, so that there should be a proper basis of comparison with future surveys, which would reveal the actual facts.

Such a survey was made in 1842. Permanent monuments were erected at the points at which the angles were taken, and all the details properly recorded in the third volume of the report of the Natural History Survey of the State of New York. After the lapse of sixty-three years, the last of four recent official surveys of the Falls was made in 1905, by Mr. W. Carvel Hall. Taking these surveys as the basis of his calculations, Dr. G. K. Gilbert, one of the most experienced members of the United States Geological Survey* has reached the conclusion that the actual annual rate of recession of the Horse Shoe Fall for the whole period, between 1842 and 1905, is 5.3 ft. The Horse Shoe Fall has receded since Sir Charles' visit 338 ft. There can be no question, therefore, that at the beginning of the Christian era the edge of the cataract was 1¾ miles lower down than now, and that at the time of the Trojan War it was at the head of the whirlpool rapids, nearly three miles below, and that at that more distant period of human history, marked by recent discoveries in Egypt and Babylonia, this marvelous cataract was just beginning its work of erosion, while Canada was still as well within the grasp of the glacial epoch as Greenland is to-day.

Prof. N. H. Winchell's investigations into the age of the Falls of St. Anthony at Minneapolis lead to almost identical results, results which are confirmed by the general appearance of almost all the waterfalls of the glacial region of North America.

2d. There are innumerable river valleys, large and small, within the glaciated region whose limited depth and width bear indubitable testimony to the shortness of time during which the streams have been active in erosion. Through some public works in Oberlin, Ohio, I have had unusual opportunities the last few years to make definite observations upon the extent of the erosion of a small post-glacial stream and upon the rate of its activity.

As soon as the glacial ice had retreated north of the watershed separating the Mississippi Valley from the Great Lakes, and up to the time when the ice had melted off from the Mohawk Valley, permitting the Falls of Niagara to begin their work, a temporary body of water occupied the Lake Erie basin with its outlet into the Mississippi Valley. The shore lines of this temporary lake are easily followed for hundreds of miles.

Plum Creek, from which this new evidence comes, is in the village of Oberlin, Lorain County, Ohio, 12 miles back from the present

*See *Bulletin of the U. S. Geological Survey*, No. 306, 1907.

lake, and 5 miles back from the old shore line. This old shore line is 200 ft. above the present lake, and Plum Creek is 250 ft. above the lake, or 50 ft. above the level of the shore line of the glacial lake. The creek, therefore, has been at work eroding its present trough ever since the ice retreated from the southern watershed far enough to permit the water of the glacial lake to settle down to the level of the 200 ft. shore line. It is well known that this level was determined by the elevation of the coll at Fort Wayne, Ind., leading into the Mississippi Valley through the head waters of the Wabash River. Plum Creek, therefore, is as much older than Niagara as the time required for the retreat of the ice from the Mississippi watershed to its removal from the valley of the Mohawk in Central New York, amounting perhaps to 1,000 or 2,000 years.

Upon measuring a section of the eroded valley 5,000 ft. long, I was able to determine the total amount of work done by the stream since the beginning of its flow. Twelve years ago the village, in constructing waterworks, turned the course of the stream into a new channel, cut for it 500 ft. long, so that we are now able to estimate the rate at which this stream, under favorable circumstances, is carrying away material from the valley. As the full calculations and results are soon to be published elsewhere, I shall not go into details here, but will simply say that they are entirely inconsistent with a supposition of more than 10,000 or 12,000 years, as the period of the stream's activity. The calculations fully corroborate those which have been made concerning the age of Niagara Falls. The supposition that this creek has been at work for 100,000, or even 35,000 years, is absurd, in view of its present known activity.

3d. The small extent to which the innumerable lakes, ponds, and kettle-holes, which dot the glaciated region, have been filled up, leads to the same conclusion. Such are the forces at work to drain and fill up these depressions that a few thousand years is all that is required to bring them into their present condition. Many of them have been already obliterated, while the others show that the obliterating forces cannot have been in operation many thousand years.*

4th. Another confirmatory witness to the short time which has elapsed since the glacial epoch, is found in the small extent to which the surface of limestone strata, which were once highly polished through the action of glacial ice, have since that time been disintegrated and eroded by sub-aerial agencies. The activity of these agencies can be seen on the tombstones in any ancient cemetery, and in the exposed walls of old buildings. Now, in the glaciated region, where polished limestone surfaces have been exposed, there are frequently in close proximity areas that have been protected by superincumbent large boulders, which are standing on a low pedestal left in the process of surrounding sub-aerial erosion. But these pedestals are never

*See Author's *Ice Age in North America.*

MOST NORTHERN ESKIMO SETTLEMENT AT CAPE YORK, GREENLAND
Photo by Dr. Libbey

more than 2 or 3 in. in height, showing that a few thousand years would be amply sufficient to produce the results.

5th. Though there was a great destruction of animal species in connection with the closing stages of the glacial epoch, there has been little change since then in the species of plants that remain; while the identity of the species of plant life and the freshness of their remains found in glacial deposits make an irresistible impression of the proximity of the great ice age to the present time. In various parts of the United States there are the remains of red cedar forests buried beneath glacial drift in which the perfume of the cedar lingers as fresh as if cut but yesterday.

Comparing now the chronology of the human race in the Euphrates Valley, and that of glacial man in Northwestern Europe and in America, it would appear that they were for a time contemporaneous; and that the human race presented about as great extremes in culture then as it does now. With the exception of various labor-saving inventions, which have been made within the last three or four centuries, the civilization in ancient Babylonia was as far above that of contemporary Paleolithic man, living on the border of the ice-fields in England and America, as that of Europe is above that of the Eskimos, who live upon the borders of the Greenland ice-fields. Substantially the same differences in culture existed then as exist now.

Considered in its total result the progress of mankind has not been by any means so great as it is popularly represented to have been. Ten thousand years ago the human race possessed all the leading characteristics which it possesses at the present time. There were

ESKIMO WOMEN IN FRONT OF THEIR SKIN TENT, CAPE YORK, GREENLAND
Photo by Dr. Libbey

centers of high civilization in favored localities, and there were wide areas of barbarism and savagery, where man barely maintained his existence through a desperate struggle with the conditions of life. The same is true to-day, only the centers have shifted and some races have come into possession of knowledge, enabling them to control the forces of nature for certain purposes much more completely than ever before, but a large portion of the human race is still carrying on the struggle, while in possession of only the most primitive means of culture. The Stone Age has not wholly disappeared from the world.

The probable influence of the glacial epoch upon the early history of mankind will be best perceived by taking a general view or the progress of geological events in post-Tertiary time. In doing so it is important to note that the Tertiary period, which culmiated in the glacial epoch closed with a high elevation of land over all the northern hemisphere. This is evident from so many facts that we do not need to pause here for their full presentation. Briefly stated, the facts are that all the northern part of America stood at an elevation of between 2,000 and 3,000 ft. above that which it has at present. The same is also true of Northern Europe. During the Tertiary period, also, as is well known, all the high mountain chains of the world received their present elevation; marine strata of the middle Tertiary period being frequently found at an elevation of from 10,000 to 15,000 ft. above the sea. In the latter part of the Tertiary period, also, the animal species which now occupy the earth, attained their present characteristics, while a large number of closely allied species, which attained great prominence, flourished for a while, but in connection with the vicis-

situdes of the glacial epoch either became extinct, or shifted the center of their field of occupation. From the evidence of man's coexistence with them during the closing stages of the glacial epoch, it would appear that he, too, came upon the scene soon after the close of the Tertiary period, and was distributed over the surface of the earth, while the elevation of the Tertiary period still furnished land communication between the Eastern and Western Hemispheres.

Presumably this land communication was between Asia and North America in the region of Behring's Straits and Behring's Sea. Here an elevation of a few hundred feet would lay bare a vast tract of land, furnishing pasturage for animals and all the means of sustenance that primitive tribes would demand. The same amount of elevation would also lay bare a border of the American continent all the way to California, which is now only slightly submerged, and open the way for the dispersal through America both of man and of the now extinct animals with which he was associated.

Clear evidence that this was the course of events is shown by man's association with the mammoth. The remains of this huge species of elephant are found in great abundance in connection with those of man, not only over Northwestern Europe, whither they had migrated in one direction from their original center, but all over Northern Siberia, and the islands adjoining, and onward to Alaska, and over the northern part of the United States, penetrating, on the western coast, as far south as Mexico.

With these things in mind, we may now see how important a factor the glacial epoch probably was in affecting the destinies of man. This elevation of land at the beginning of the glacial epoch probably continued far down toward its close, when it was followed by a depression to a level considerably below that of the present time. This is clearly evinced by post-glacial marine deposits and beaches which are now found several hundred feet above the sea in Canada and Scandinavia. The extreme depression, as shown by these raised beaches, was in both places fully 1,000 ft. It is evident also that at the time of the extreme extension of glacial ice in America, the gradient of all the southern flowing streams was greatly reduced, indicating a differential northerly depression over the whole interior of the United States.

It is easy to see, therefore, that during the culminating period of the glacial epoch, man and his contemporary animals in America were shut off from communication with Asia, and the area from which they derived subsistence was greatly limited, both by the submergence of the continental shelf and by the great extension of the ice-fields, reaching in the Mississippi Valley, in Southern Illinois, the latitude of 38°. At the same time, there was a great incursion of the ice upon the fertile portions of Europe, Switzerland was obliterated, Great Britain nearly so, all Northern Germany was covered, and Russia to within a short distance of the Black Sea.

On the other hand, Central Asia seemed to receive a great increase of fertility. From recent investigations it appears that Siberia and Central Asia were not invaded by glacial ice.* But there was a great extension of the glaciers still existing in the high mountains. Those of the Thianshan range merit special mention. This vast mountain system rises in peaks to a height of 23,500 ft., or 8,000 ft. higher than the Alps; while its mass is estimated to be twenty times that of the Alps. Small glaciers still exist far up in the higher altitudes. During the glacial epoch they descended to the 7,000 ft. level, but never reached the great plains at a lower level. A subsidiary result of this extension of the mountain glaciers in Central Asia was a marked increase in the size of the mountain streams upon which the population of the plains depended for irrigation.

The importance of irrigation to the population of Central Asia is not generally appreciated. Our attention has so long been fixed upon Egypt and its dependence upon the Nile, that we have not given sufficient consideration to other regions dependent upon irrigation. Now, around the base of the Thianshan Mountains, there is an area many times the size of Egypt, whose life depends upon innumerable streams—large and small—which bring down their life-giving supplies of water in due season from the heights where it has been detained in unfailing cold-storage reservoirs far more regular and reliable than the lakes of Central Africa, which are subject to the vicissitudes of the annual precipitation and to the temporary obstruction of their outlets by the accumulation of vegetable matter.

The natural influence of the vicissitudes of the glacial epoch upon the development of life in Central Asia can be readily perceived. The conditions leading to the increase of glaciers in the mountains, especially those connected with the rapid melting of the ice during the declining portion of the epoch, would greatly extend the area of fertility and promote the interests of all forms of life. It is interesting to learn that this very region, which is the traditional center for the dispersion of the human race, and in which, beyond all reasonable doubt, the Aryan races had their original home, has recently been found to be an important center of pre-historic man. Prof. Raphael Pumpelly announces, as one of the results of the Carnegie Expedition to explore the pre-historic mounds of Turkestan, the discovery of remains of man, which he estimates to date from 8250 B. C., and of other evidence, showing that at about this time man had already succeeded in accomplishing the wonderful feat of domesticating the ox and several other animals**

The decline of the glacial epoch in Central Asia is connected, either as cause or effect, with the subsequent diminution of the size of the mountain streams and the general desiccation of that region, thus reducing its fertility. The result of this has been to intensify the

*See Wright's *Asiatic Russia*, 2 Vols. McClure & Co., New York.

**See his *Report to the Carnegie Institution*, Washington, 1906.

UNIRRIGATED SECTION OF LOP BASIN SOUTH OF ENDEREH,
CHINESE TURKESTAN

Photo by Ellsworth Huntington

IRRIGATED STRIP, WHICH WOULD OTHERWISE BE ABSOLUTE DESERT,
NORTH OF THE TIAN SHAN MOUNTAINS IN TURKESTAN

Photo by F. B. Wright

struggle for existence, to compel increased migration, and thereby to give a new impulse to new centers of civilization. It is worthy of mention, also, that the same diminution of glacial conditions in Central Asia which limited its capacity to support population, opened up the fairest portions of Europe and North America, and invited their occupation by man. In America we are but just entering upon our inheritance. America's great prosperity being largely due to the rapidity with which we are now seizing the reserved stores of richness accumulated in our soil by the glacial deposits and by the chemical changes which have taken place during the thousands of years through which it has since been lying fallow.

The disturbing influence of the glacial epoch is specially to be noted in the destruction of animal species, which, in some way, took place in connection with it, including, apparently, that of a large portion of mankind. At the close of the Tertiary period "the great Irish elk, the *machairodus*, and cave lion, the rhinoceros, hippopotamus, and elephant" roamed over Europe, and "equally large felines, horses, and tapirs, larger than any now living, a llama as large as a camel, great mastodons and elephants, and abundance of great megatheroid animals of almost equal size" were abundant in North America, "while in South America these same megatheroids in great variety, numerous huge armadillos, a mastodon, large horses and tapirs, large porcupines, two forms of antelopes, numerous bears and felines, including a *machairodus* and a large monkey," flourished. But all of these have become "extinct since the deposition of the most recent of the fossil-bearing strata,"* and their destruction can be very clearly traced to the vicissitudes of the glacial epoch.

In the glaciated regions the bones of all these northern species are found in abundance in the gravel and loess deposits connected with the closing scenes of the epoch, or in the bogs where the animals had been mired in the early part of the post-glacial period. That man shared in this destruction throughout North America and Europe is rendered altogether probable by the way in which his remains are associated with those of these extinct animals. These have been found in connection with the bones of one or more of the above-mentioned animals deeply buried in undisturbed beds of loess in definite relations to certain stages of the glacial recession at Omaha, Nebr.; Lansing, Kans., and Kiev, Russia. They have been found in similar connection with the bones of these extinct animals in various gravel deposits of glacial origin in the United States (notably at Trenton, N. J.), and in similar deposits, doubtless of the same age, in Northern France and Southern England, while a similar connection between these extinct animals and man is shown by still more abundant evidence in the results yielded by the excavations of numerous prehistoric cave dwellings in Northwestern Europe.

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*Alfred Russell Wallace, *Geological Distribution of Animals.*

At this point it will be profitable to turn our attention to the process by which this great destruction of man and his post-Tertiary animals was secured. Evidently the destruction was brought about largely as a result of the disturbance of conditions affecting the struggle for life between competing species. In the advance of the glacial ice in North America, for instance, animals and plants were driven southward from an area of 4,000,000 square miles; the southern border of which reached in Illinois nearly to the junction of the Ohio with the Mississippi River in latitude 38°.

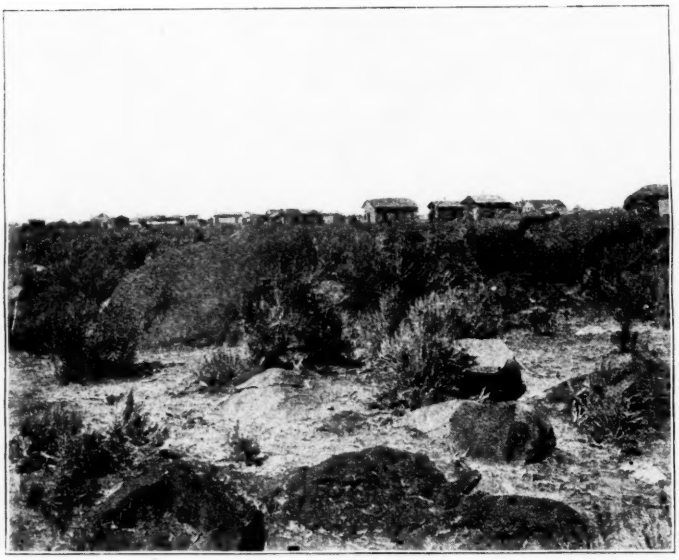
It is impossible to over-estimate the strenuousness of the struggle for existence which was set up in the restricted area in the southern part of the United States and Northern Mexico, lying between the glacial conditions in the north and the tropical conditions, which prevented migrations southward across Central America. Then, again, upon the amelioration of the northern climate and the re-opening of the northern region to the animals which had survived the former changes of conditions, many of them re-occupied the ground, and began the struggle with new conditions, to which some of them, especially the mammoth, in due time, succumbed.

Local floods of enormous extent during the closing stages of the glacial epoch seem to have been connected in a marked degree with the destruction of both man and animals, which took place during this epoch. The remains of man, which have been found within the last few years in the loess of the Missouri Valley (referred to above), are connected with annual floods, which can be definitely proved to have risen 200 ft. These floods were occasioned by the rapid melting of the ice in the upper part of the valley, and the gorging of the water lower down, producing annually for a while in the latter part of each summer a temporary lake 1,000 miles long and from 70 to 80 miles wide. Similar conditions existed in the valley of the Ohio and down the Mississippi as far as Vicksburg.

At this time the depression which now contains Great Salt Lake in Utah, was filled up to a depth of 1,000 ft., and covered an area of 20,000 square miles, ten times that of the present lake. When at last this glacial lake surmounted its barriers and broke over into the Snake River Valley, it quickly brushed away 350 ft. of the dirt barrier which restrained it, and that depth of water rushed down the valley in a torrent as large as Niagara for 25 years.* The results of this are incomprehensible.

Likewise, in Southern Russia, if the loess covering that region is connected with the same stage of the glacial recession, man and his associates were there subject to a similar destruction by local floods. Distinct evidence of a great change of land level of that region at about that time appears in a raised beach of modern origin 750 ft. above the Black Sea at Trebizond. In fact, I think there is conclusive

*See Gilbert's *Report on Lake Bonneville, U. S. Geological Survey.* A summary is given in my *Man and the Glacial Period,* New York, 1900.



BOULDERS LEFT IN THE BED OF THE OLD OUTLET OF LAKE BONNEVILLE, AT POCATELLO, IDAHO

evidence that all Northern Siberia, Western Turkestan, and the larger part of Russia were depressed below sea-level in connection with the great earth movements which took place during the latter part of the glacial epoch.

At a corresponding period, also, the Tarim depression south of the Thianshan Mountains, was covered with water to a great depth. I had suggested* that this may have been occasioned at the time of the depression apparent in Northern Siberia by the water pouring over into the desert of Gobi, through the Sungarian depression, but Mr. Ellsworth Huntington, who has recently returned from an exploring expedition in that region, thinks that this accumulation of water in the Gobi basin was directly due to the glacial conditions, which gave to the glaciers in the surrounding mountains the vast extension to which we have already referred.** If that be so, it would be in close analogy to the enlargement of Great Salt Lake, the existence of both bodies of water being synchronous.

In the case of the Dead Sea, which Professor Hull has shown to have been filled with water within a comparatively recent time, he has suggested that this enlargement, like that of Great Salt Lake and Lob Nor, was a direct result of the glacial epoch, and of the accumulation of glaciers upon the mountains at the north. But as my investigations appear to show that the Lebanon Mountains never supported

*See *Scientific Confirmations of Old Testament History*, Bibliotheca Sacra Co., Oberlin, O., 1907

**See the *Geographical Journal*, vol. xxx, No. 3, Sept., 1907.

more than one glacier, and that a small one, on whose terminal moraine the famous grove of cedars is now standing, I am inclined to connect the temporary enlargement of the Dead Sea (during which the Jordan Valley was filled to a depth of 1,400 feet) to that post-glacial depression of land, which we have traced so extensively elsewhere, and of which Professor Hull and others have adduced such clear evidence around the eastern border of the Mediterranean basin. This depression was certainly 250 ft., which would be sufficient to admit Mediterranean water into the Jordan Valley through the valley of Esdrealon, whose highest point is only 215 ft. above sea-level.

That these great changes of land level were in some way connected with the glacial epoch is beyond question. And it is not difficult to perceive in the forces connected with this remarkable epoch, a cause for this unstable condition of the earth's crust so late as that of the pre-historic period of man's existence. During the glacial epoch at least 6,000,000 cubic miles of ice were piled up over the northern part of America and of Europe. For the production of this ice enough water would have to be abstracted from the ocean to lower its level 250 ft. the world over. Other high authorities would make the amount of ice twice, or even three times, that which we have indicated, with a correspondingly larger amount of water abstracted from the ocean.* But even on my own moderate estimate, we have a shifting of weight from the ocean beds to the limited area of glaciation, amounting to 24,000,000,000,000,000 tons, equalling the total weight of the North American continent. The transference of such an enormous weight from the ocean to the continents, and its subsequent return to the ocean is a force so inconceivable that we cannot estimate its efficiency in disturbing the equilibrium of the continents, and causing depressions and elevations of land out of all analogy to those which we have witnessed within the historic period. But pre-historic man evidently did witness these disturbances, and was profoundly affected by them.

Indeed, the story of the Noachian Deluge becomes easily credible to the attentive student of the shifting forces at work during the glacial epoch, and the rapidly changing conditions to which man was subjected during this trying period of his history may readily account, on the principle of Natural Selection, for the rapid differentiation of the race in its final distribution over the world.

While the results of our studies in the glacial epoch are not as definite in their results as one would wish, this important conclusion is established, namely, that in the early periods of the existence of the human race there was an instability of conditions arising from the instability of land levels, caused by the glacial epoch, which frustrates all attempts to reason backward by analogy from present conditions.

G. FREDERICK WRIGHT.

*See, Chamberlin and Salisbury's *Geology*, vol. iii, pp. 327-502.

BABYLONIAN BOUNDARY STONE, WITH FIGURE OF A KING, PROBABLY NEBUCHADREZZAR I.

BABYLONIAN BOUNDARY STONES

PROFESSOR W. J. HINKE, Ph.D., D.D., of Auburn Theological Seminary, is the author of a notable work, recently published by the University of Pennsylvania, through the generosity of Mr. Eckley B. Coxe, Jr., of Philadelphia, under the title *A New Boundary Stone of Nebuchadrezzar I,** which includes a discussion of all Babylonian boundary stones discovered up to the present. Some of these are translated for the first time by the author. The following summary is offered of this important scientific contribution, which otherwise might remain inaccessible to some of the readers of the RECORDS OF THE PAST, together with a selection from the illustrations of the work.

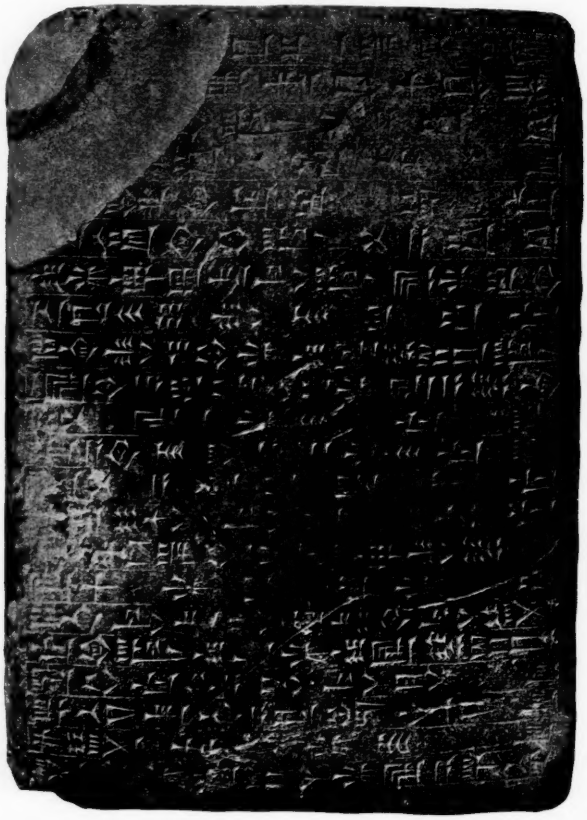
Among the innumerable monuments found in the ruins of Babylonia there are few which equal the Babylonian boundary stones in their many unique features. Not only do these boundary stones belong to the earliest Babylonian monuments which reached Europe (for the first one, the now famous Caillou de Michaux, was brought to Paris in the year 1800), but they were also among the first Babylonian inscriptions to be deciphered by scholars. In 1856, the French scholar, Jules Oppert, gave the first approximately correct interpretation of the Michaux stone. The number of the boundary stones that have been discovered has rapidly increased, so that at the present time 36 such stones are known to be in existence, 20 of which are with inscriptions intact or nearly so, and 16 fragmentary, some of them very small. They cover the period from the Cassite King Nazi-Maruttash, about 1350 B. C., to that of Shamash-shum-ukîn, or 650 B. C.

The boundary stones bear inscriptions, which contain grants of land. They correspond, therefore, to our modern deeds. Most of the boundary stones which have survived were placed on land granted by the king. It was only in later times that their use was also extended to land not granted by the king, but secured through purchase or given to daughters as their dowry. In one case a stone, shaped as the common boundary stones, was used to record the investiture of a priest of Nebo at Borsippa, with certain rights and privileges pertaining to his office.

Professor Hinke holds that there were usually two stones, one a large conical block, to be placed upon the field for the information of the public, the other a stone tablet (See p. 40), to be held by the owner as a proof of his ownership. The purpose of the public boundary stone was not to mark the boundary, for such a purpose a number of stones would have been necessary (as is the case in Egypt), but to

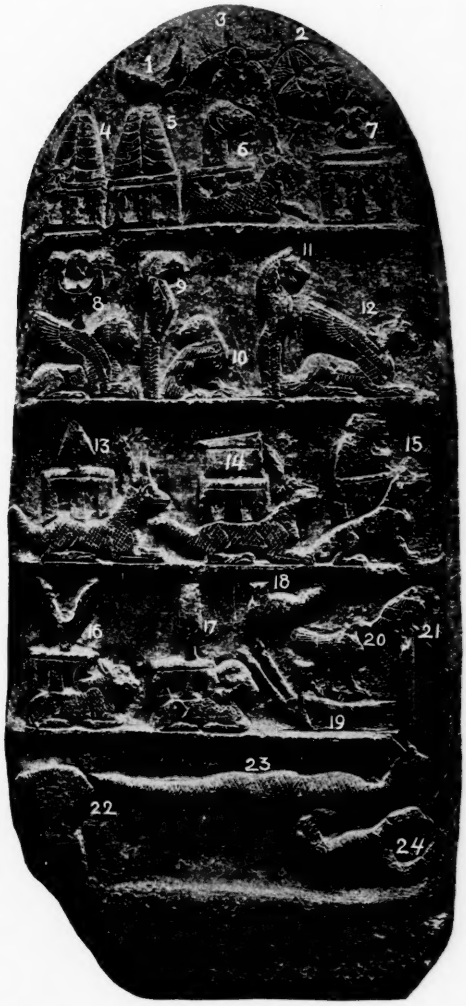
*Series D, Vol IV of *The Babylonian Expedition of the University of Pennsylvania*. H. V. Hilprecht, Editor, 1907, pp. xxvii, 323.

indicate and guarantee the ownership of the land. The ownership was indicated by the inscription, it was guaranteed by the curious divine-symbols (which are referred to later), placed on top of the stone, and the long-drawn-out curses, which are the most peculiar feature of these inscriptions. Through them the land and stone was placed under the protection of the deities that were invoked. As these were sacred stones in other parts of the Semitic world in which the deity was supposed to dwell (*cf. e. g.*, the declaration of Jacob: "This



STONE TABLET OF ELLIL-NADIN-APLU, CONFIRMING A GRANT OF LAND TO A TEMPLE OF THE GODDESS NINA AT DER

stone which I have set up as a pillar shall be the house of God," Gen., xxviii., 22), so the boundary stones of Babylonia were no doubt regarded as sacred because they were looked upon as instinct with divine life. They were placed under the special protection of NIN-IB, who is called "the lord of the boundary and of the boundary stone." Sometimes his wife, Gula, is associated with him and mentioned with him in the curse to tear out the boundary stone of the enemy.



BOUNDARY STONE OF KING MELI-SHIPAK, GRANTING LAND TO HIS SON, MARDUK-APAL-IDDINA I.

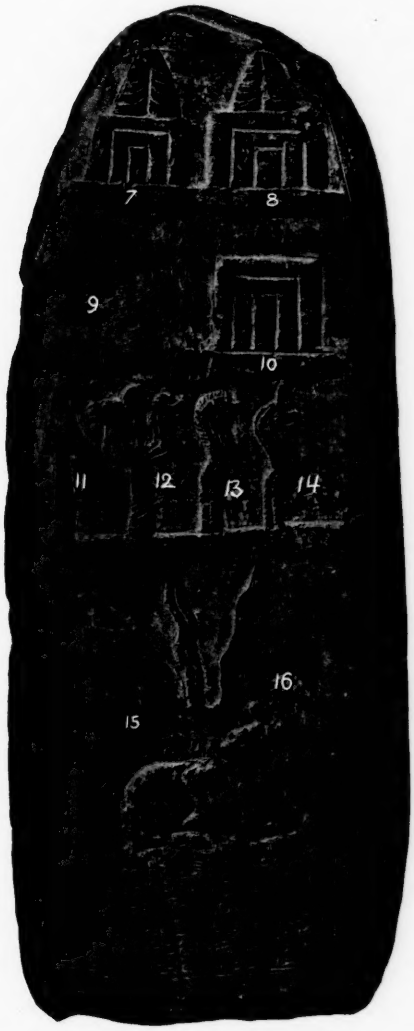
According to the legal transactions recorded on the boundary stones (which are called Kudurru in Babylonian), Professor Hinke classifies them under the following heads: (1) Such as contain a royal grant to a distinguished royal officer to reward him for some service rendered. Of this kind may be mentioned as an example a boundary stone of King Meli-Shipak. It contains the longest inscription of this sort, 387 lines in 7 columns. By it the King deeded a tract of land consisting of 84 *gur* 160 *qa* of cultivated land of the town Tamakku,

of the communal land of Akkad, at the Royal Canal, to his son and successor Marduk-apal-iddina I. The remarkable feature of this grant is that the King compensated the people whose land he took by assigning other land to them. We have now no less than 9 boundary stones, conveying land by royal grant to distinguished officials. The latest one is of interest to Bible readers because it contains a grant of land by King Marduk-apal-iddina II, the biblical Merodach-baladan (*cf.* Isa., xxxix:1, ff., 2 Kings, xx: 12-19), to Marduk-ahê-erba, a dignitary of Babylon. Four tracts of land were granted to him, in the presence of Iqisha-Marduk, the King's son, and 9 dignitaries of the realm, in the seventh year of Merodach-baladan, or 714 B. C.

(2) A second kind of boundary stones, records grants made to fugitives. There are two examples of this kind. One of them states that Shamûa and Shamai, two priests of the god Eria fled from Elam to King Nebuchadrezzer I, who not only received them, but went with them to Elam, accompanied by an army, devastated Elam and transferred the statues of Marduk and Eria to Babylonia. The statue of Marduk was taken to Babylon; the statue of Eria to a town Hussi, in the district Bît-Sin-asharidu, not far from Opis. There the priests were settled and a tract of land was granted them to be held by them as temple property. It was also freed from all imposts and territorial obligations.

(3) A third class of boundary stones, according to Professor Hinke, records grants made to temples. This group includes the oldest boundary stone which has come down to us. It belongs to the reign of Nazi-Maruttash, who granted several tracts of land, in all 700 *gur,* to the god Marduk. But only 494 *gur* were given directly to the god, the remaining 206 *gur* were given to Kashakti-Shugab, son of Ahu-bânî, the priest of Marduk. The characteristic feature of this stone consists of two medallions, placed alongside of the inscription, which inform us that "Kashakti-Shugab, son of Ahu-bânî, wrote a memorial tablet of terra cotta and set it up before the god. In the reign of Marduk-apal-iddina, the son of Meli-Shipak, a wall fell upon that tablet and broke it. Shuhuli-Shugab, son of Nibi-Shipak, wrote upon a new monument of stone a copy of the original and set it up." This interesting statement shows that the priest himself wrote the original inscription, which he put into the archives of the temple for safe keeping. This original was of terra cotta, but stone was substituted when the terra cotta tablet was broken. This indicates, Professor Hinke concludes, that stone tablets had not always been used, but originally clay tablets, such as were used for all other purposes, were employed.

(4) A fourth group consists of grants involving restorations. For example, King Nabû-apal-iddina (*c.* 865 B. C.), granted the restoration of a certain tract of land to a priest, Nabû-apal-iddina (a namesake of the King), after it had been bought by his uncle. Nabû-apal-iddina appealed to the King for its restoration on the plea that it

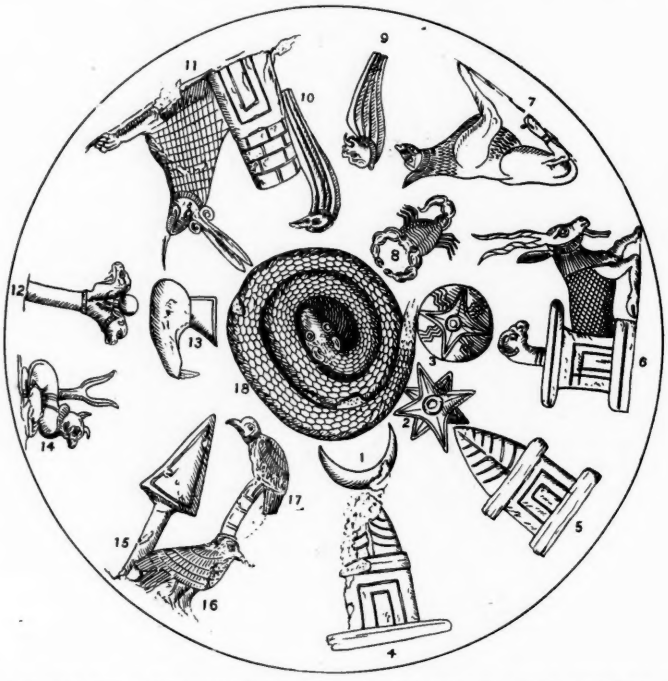


BOUNDARY STONE OF KING NAZI-MARUTTASH FOUND AT SUSA

was a part of the family estate which should not be alienated from the family. The request was granted by the King.

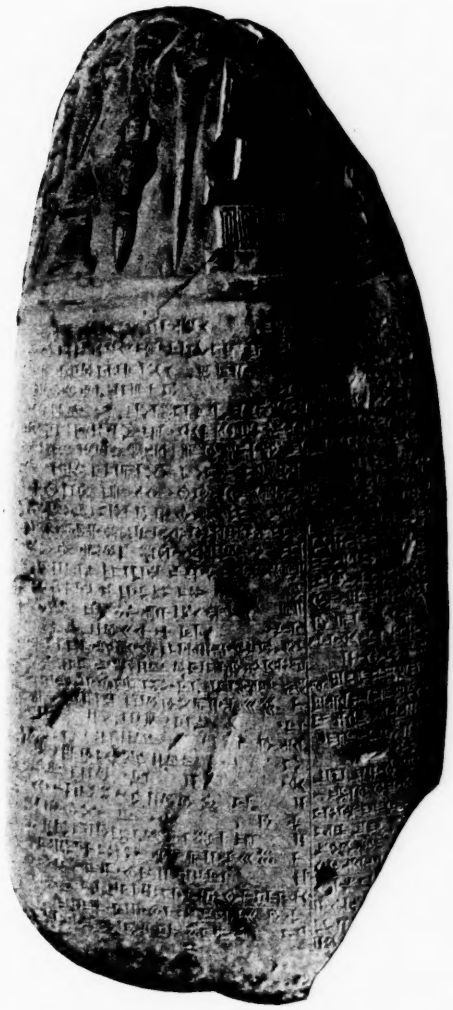
(5) Several boundary stones contain grants involving lawsuits. A stone of Marduk-apal-iddina I. states that a certain tract of land, situated at the banks of the canal Mê-dandan, in the district Hudadu, had been given by Meli-Shipak to his servant Munnabittu, son of Tâbu-melû. Officials of the King had surveyed the field and it had passed into the possession of Munnabittu. Unfortunately the King

failed to give him a deed. Meanwhile Munnabittu remained in peaceful possession of the land till the first year of Marduk-apal-iddina I., when one of his neighbors, Ahunêa, son of Daiân-Marduk, claimed a part of the field. Munnabittu appealed to the King, who summoned Kidin-NINIB, the former governor, under whom the field had been granted, and the old city officials, whom the King questioned about the field. They were unanimous in saying that the field belonged to Munnabittu. The King thereupon sent the governor and a scribe, who measured the field and found it to be 30 *gur,* as Munnabittu claimed. In view of this evidence the King confirmed the land to Munnabittu.



SYMBOLS ON A BOUNDARY STONE OF MARDUK-APAL-IDDINA I., DISCOVERED AT SUSA

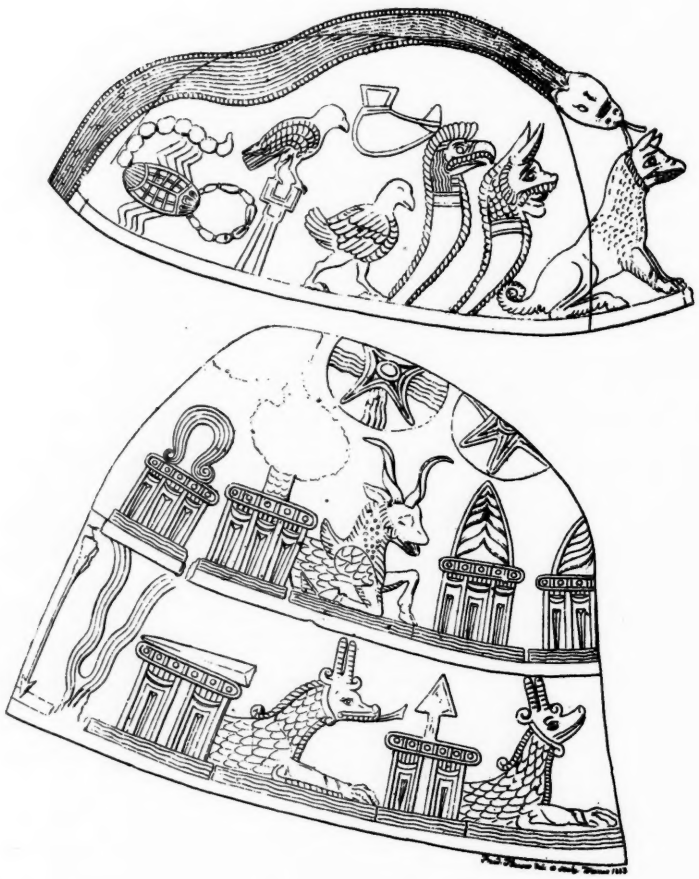
(6) Another class of royal grants are really charters, by which exemption from taxation and immunity from forced labor was granted, sometimes in connection with a grant of land, in other cases it was a charter pure and simple. The former kind is illustrated by the stone published by Professor Hinke, which is a grant of land made by King Nebuchadrezzar I. to a priest at Nippur, Nusku-ibni, son of Ûpahhir-Nusku. In this case the grant of land was accompanied by the following exemptions: No outsider was allowed to make use of the pasture lands; no canal officer was permitted to impress a canal digger into service, nor could land officers cut down any grass. In



BOUNDARY STONE OF NEBUCHADREZZAR I., FROM NIPPUR

other inscriptions, as the grant of Meli-Shipak to his son (mentioned above), or the charter of Nebuchadrezzar I. to his distinguished general, Ritti-Marduk (V. R., 55-56), the immunities were much more numerous.

(7) In later times, Professor Hinke maintains that the use of boundary stones was extended to the transfer of private lands from one individual or family to another. In this class there are two subdivisions. One which represents dowries granted to daughters, the other purchases of land. Of the first, the famous Caillou de Michaux



SYMBOLS ON THE CAILLOU DE MICHAUX, NOW IN PARIS

is an example. It records a grant of 20 *gur* of cultivated land, at the canal Mê-dandan, in the district Bit-Habban, by Sir-usur, son of Habban, to his daughter Dûr-sharru-kênaiti, bride of Tâb-ashab-Marduk. In this transaction the bridegroom had to swear "by the great gods (Anu, Ellil, Ea), and the god Sir (probably the family god), not to make any claim for that field."

As an example of a deed for a purchase of land, Professor Hinke mentions one from the reign of one of the first kings of the PA-SHE dynasty. It records the purchase of 5 *gur* of land by Marduk-nâsir, an officer of the king, from Amel-Ellil, son of Hanbi, for one wagon, several horses, asses, oxen, harness, grain, and clothing, in all worth 816 pieces of silver.

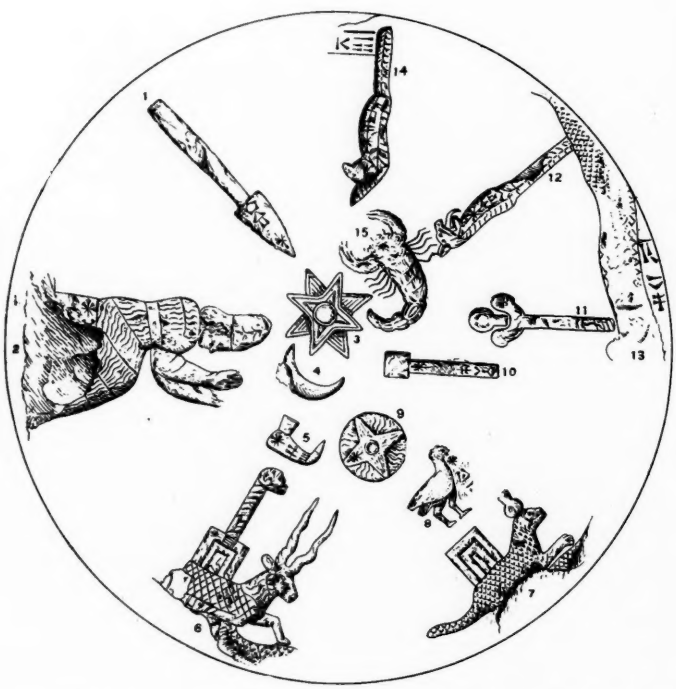
A *kudurru* inscription, Professor Hinke informs us, usually contains 5 or 6 parts. In four cases the stone has a name, *e. g.*, "Ninib and Nusku establish the boundary." Then follows a description of the field. The total area is given and the different sides are carefully bounded by referring to the adjoining properties. Next is found a statement as to the historical circumstances that led to the grant. Then follows a series of injunctions against all kinds of officials who might interfere with the land, its area, and its privileges. The next section, which is the most characteristic feature of these inscriptions, contains the curses. The gods are invoked and are asked to send all kinds of diseases or calamities upon the would-be offender. Finally, the witnesses are given, and in some cases the date is added. The curses are remarkable for the extraordinary variety and their large number. On a stone of Marduk-apal-iddina I. (Susa, No. 16), 47 gods are invoked, arranged in pairs and groups. The number of all the gods invoked in the curses is 58, thus far, but only a dozen occur frequently. Professor Hinke tells us that in all there are about 100 curses on the various boundary stones, uttered in the name of about 30 gods. The most characteristic curses are as follows: Ea is asked to send melancholy; Gula, a destructive sickness; Ishtar, loss of weapons in battle; NIN-IB, removal of boundary and death of children; Nusku, burning of root (destruction of family), and headache; Rammân, destruction of fields through floods; Sin, leprosy; Shamash, blindness, deafness, and lameness; Zamama, bad luck in battle.

Several of the boundary stones have a picture of the king who made the grant, in some cases also a picture of the person to whom the land was granted. We have pictorial representations of one of the first kings of the PA-SHE dynasty,* probably Nebuchadrezzar I.; also pictures of the kings Nabû-mukîn-aplu, Nabû-apal-iddina, and Merodach-baladan II.

The most remarkable features of the Babylonian boundary stones are the symbols sculptured on top. Professor Hinke has made these the subject of special study. He mentions the various theories about their meaning. But from one of the stones recently found at Susa by the French (Susa, No. 1), we now know definitely, as the author says, that these figures are emblems of the gods, because the names of the gods are written on the symbols. Here we find the spearhead ascribed to Marduk, the mace (club) with the vulture head to Zamama, the mace with the lion head to Nergal, the mace with the square top to Shuqamuna, the walking bird most likely to Bau, the shrine with goat-fish and ram's head to Ea, the lamp to Nusku, the seated goddess to Gula, and the serpent to Siru. The names of the other symbols have been effaced. However, we know from other stones that the crescent stands for Sin, the sundisk for Shamash, the eight-pointed star for Ishtar. Besides these, other symbols can be

*See p. 38.

THE ARCHER, FROM A BABYLONIAN BOUNDARY STONE



SYMBOLS ON A BOUNDARY STONE FOUND AT SUSA, WITH THE NAMES OF THE GODS WRITTEN ON THE SYMBOLS

THE ARCHER FROM THE EGYPTIAN ZODIAC OF DENDERA

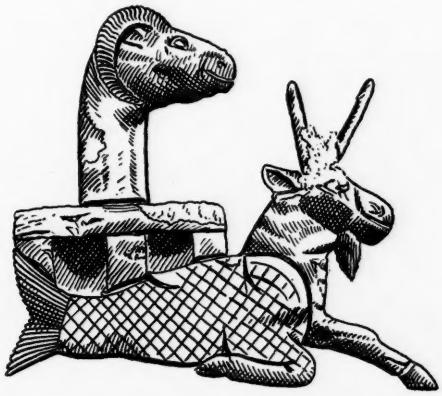
identified with certainty, with their respective deities. Some of these identifications have been made for the first time by Professor Hinke. The two shrines with tiaras stand for Anu and Ellil. The forked lightning for Rammân, the square column (or shrine with wedge), for Nabû, the mace with two lion heads for NIN-IB, the 7 stars for the Sibitti, the shrine with the yoke-like figure (really the plaits of hair), for Ninharsag or Ninmah, and the scorpion for Ishhara. As a result we have thus far been able to identify 20 symbols with their corresponding deities. But the symbols are more than mere emblems of the gods. An astral character was ascribed to the gods of Babylonia. The constellations of the heavens were regarded as the dwelling places of the gods. The stars were under their control. They guided them and kept them in their courses. The most important of the heavenly constellations were the signs of the zodiac, and hence we find that some of the symbols on the boundary stones represent, not only the gods, but also their corresponding signs in the zodiac. The clearest case is that of the Archer or Sagittarius. By comparing the Archer as he appears on one of the Babylonian boundary stones (London, No. 101) with the same figure on an Egyptian zodiac, found in the temple of Dendera (dating from the time of the Roman Emperor Augustus), it is readily seen that the figures are identical and that the Egyptian figure, which undoubtedly represents a sign of the zodiac, is borrowed from the Babylonian. In both figures we find a winged centaur, drawing the bow, with a double head, one human, the other animal, and a double tail, one of a horse, the other of a scorpion. The same similarity is shown in the Babylonian Capricorn or Goat-fish, compared with the Egyptian, and in the Babylonian and Egyptian Waterman, or Aquarius. Hence, there can be no doubt

that at least some of the figures on the Babylonian boundary stones represent signs of the zodiac. But as there are more than 40 different signs on the various stones, Professor Hinke holds that other stars must be represented. Now, it is a remarkable fact that on a marble plate, recently found in Egypt, two circles of constellations are represented, both containing animal figures, the outer circle showing the signs of the zodiac. Moreover, a Greek writer, named Teucros, the Babylonian, whose astrological work has recently been published, shows that the inner circle was called "dodekaoros," *i. e.*, "twelve-

MARBLE PLATE FROM EGYPT, SHOWING THE ZODIAC AND THE "DODEKAOROS"

hour circle." Now it is well know that the double hour, called KASH-BU, was the common Babylonian measure for time and distance. Moreover, the double hours could not have referred to the ecliptic, because each twelfth part of the ecliptic rises at unequal intervals in the latitude of Babylon. To secure 12 equal divisions of the calendar day, the 12 parts must refer to the heavenly equator. This equatorial circle, Professor Hinke says, was, therefore, earlier than the zodiac circle, which was derived from it, and both go back to Babylonia. Several of the animals found in the equatorial circle seem

THE GOATFISH (CAPRICORN), FROM THE ROUND ZODIAC OF DENDERA



THE GOATFISH (CAPRICORN), FROM A BOUNDARY STONE OF MELI-SHIPAK

to be represented also on the boundary stones, for we find there the ox of Rammân, with the lightning fork, two birds, one walking, the other perched on a pole, corresponding to the ibis and falcon on the "dodekaoros." There is also a horse, a dragon with wings, a sheep, and a crocodile-like figure. All these occur in the "dodekaoros." Although it cannot yet be established beyond question that the figures on the boundary stones really represent those of the equatorial circle, Professor Hinke thinks that it is at least probable.

The significance and importance of these symbols lies, however, in the fact that they represent the earliest astronomical charts in existence, and go far to show that Babylonia was the home of ancient astronomy.

This summary of Professor Hinke's elaborate discussion of Babylonian boundary stones, which contains so many important discoveries and observations, will serve to illustrate the advanced state of civilization in the second millenium B. C., as well as to determine the origin of much of that with which we become familiar in later times. The work which takes such high rank as a scientific contribution is a most excellent production of American scholarship, in which the author may justly take pride, for the volume will serve as the basis for future studies in this interesting class of inscriptions.

ALBERT T. CLAY.

University of Pennsylvania, Philadelphia.

STONE GRAVES OF NORTHWESTERN ILLINOIS

PHYSICAL FEATURES OF THE DISTRICT

THE district to which attention is now called is that rugged and broken, loess-capped margin of Jo Daviess County, bordering the Mississippi Valley for 35 miles, southeast from the Wisconsin line, and more particularly the central portion of this shore-land district about Portage Station on the Illinois Central Railroad.

The physical features are mainly those of the "Driftless area of Wisconsin," so ably described in a joint memoir by Messrs. Chamberlain and Salisbury, in the Sixth Annual Report of the United States Geological Survey. The valley of the Mississippi, 2½ miles broad, extends from northwest to southeast, along the border of the county, the great river washing the Iowa shore and leaving, on the Illinois side, a wide, low plain, a network of sloughs and silted ancient channels.

Less rugged in parts than the Iowa shore, the Illinois shore is nevertheless a picturesque land of bold limestone cliffs, deep ravines, and broad, flat-bottomed tributary valleys. At the foot of the cliffs lies a mile's width of crooked sloughs, an ideal refuge and fishing or hunting-ground for a primitive people. Along the shores can be found the refuse litter of their villages, buried more or less deeply by river mud or humus, and the cliff summits above are crowned with the tumuli of their dead.

Here, in the now silent valley, was once the stir of primitive village life. Here, we see, were clustered little villages of fisher folk, at short distances, along the shore wherever the sloughs washed close in beneath a rugged cliff, and it is not difficult, as the spade exposes to view the firestones of their hearths, to re-animate the scene and hear again the sounds of village life, as the sun casts a rose light over the cliff faces and sinks beyond the dark Iowa shore. Just so the sunset came in those far-off days, and the darkness gathering over the hill of the dead crept down from forest depths through dark ravines about the blazing hearths. And later, when the moon silvers the valley, and the voice of the owl comes spectrally over the flooded bottoms, we behold again the mortuary rites on the clay platform at Mound 16.

It is impossible with the pen to convey the full depth of the romantic charm which hangs over this beautiful valley. One must see it in its countless moods, in the golden autumn, or on bright, spring days, or on gray days when the mist hangs over the Iowa headlands, and again in the dew damp of early morning.

It is not difficult to understand why we find along the shore traces of a sedentary or semi-sedentary people. Primitive man was moulded everywhere by his environment, and similar conditions developed throughout the Mississippi Valley a more or less related culture. Bearing this in mind, the value of special studies in restricted fields becomes evident, and we see that if a concentrated penetrating light can be thrown on any one section of this wide area, or better yet on a hundred such districts, no matter how small the district studied, such work is more to the purpose than superficial investigations for the sake of "collections" prosecuted promiscuously over the continent.

THE STONE GRAVES

THE GRAVES AT PORTAGE

The terminating knolls of both ridges at Portage present much the same appearance, except that the western hill presents a precipitous face on the side toward the Mississippi, rising clear of the talus some 45 ft. The summit of both knolls attains an altitude above the valley of approximately 125 ft., and the graves were located on the south and southeast and southwest slopes, and were found only on the terminal knolls. The soil is the fine, yellow loess, much more easily worked than the more elevated summits to the north, and, except in Grave II, the shallowness of the graves would indicate that a soft, yielding soil would have been a desideratum in the location of the graves. It is to be noted, however, that the spot is one singularly well chosen, if the dominant idea had been to place the graves within view from the villages on the plain below.

Near the center of the southwest face of the cliff at the western knoll is an immense vertical rift or recession, from which two tortuous passages ascend, the one to the right for a space of 20 ft. behind the face of the cliff.

The walls of these rifts are burned red throughout as are many other crevices, as though resulting from the working of the chert veins with fire. At the cliff's edge above, a portion of the ledge, now in the grasp of the roots of a long dead cedar, is burned deeply. The stump of this cedar shows 188 annular rings, and its dead roots extended through Grave II.

In none of the graves was there any attempt at a cist or stone enclosure, as in a true stone grave, but the flat slabs of limestone were thrown in upon the bones or lay in the form of a rude pavement above the interment as at Graves II and III. There were no surface indications of the burials other than an occasional outcrop of part of a stone, which doubtless the wearing away of the surface in recent years has exposed. There was no break or irregularity in the surface contour to indicate a burial below.

GRAVE II

Four stones outcropping slightly in the sod of the hillside were found to be the southeast end of a rude pavement, a foot wide, extending about level for 6 ft. northwest, under the top-soil. The top-soil, about 6 in. deep, was cleared away, and a sketch of the pavement made, which consisted of 18 irregular weathered pieces of limestone burnt red at one point. One large stone lay detached to the east, having one burnt corner, evidently a displaced stone of the pavement.

Charcoal was found at a depth of 6 in. and in increasing quantity downward through the yellow earth and all among the bones of the skeleton. The grain of the wood resembles cedar and oak. Except for the presence of the charcoal and a few lumps of harder earth or ash, there was no indication of a disturbed soil until the immediate vicinity of the skeleton was reached.

At a depth of 2 ft. 6 in. under the center of the pavement was charcoal, which seemed to be like a thin, curved board, the convexity upward, and just north of this was a small circular spot of charcoal. The largest quantity lay over the thighs, at a depth of 2 ft. 10 in., and from this there were scattered bits down to a contact with the bones at a depth of 3 ft. Other small patches lay 4 and 7 in. higher, over the left hip and pubis.

The earth within the grave was as compact as elsewhere; there was no discoloration, and except for the distribution of the charcoal no way to determine the size or limit of the grave. It is difficult to understand how a grave could have been excavated to a depth of 3 ft. or more and refilled without producing a mixture of earth either within the grave or in the top-soil along the edges of the excavation.

The skeleton, in a fine state of preservation, lay extended at full length on its back, with the shoulders, neck, and head slightly raised, and the chin resting upon the breast at a depth of 2 ft. 6 in. The face was turned slightly to the right, as if gazing in a long, last look down the great valley. The right hand rested across the pubis, the finger bones falling just over and inside the head of the right femur. The left hand lay beneath the pelvis and under the shaft of the left femur. Two-thirds of the distance along the inner side of this femur were two small, flat, triangular arrow-points of translucent quartz, or flint. The larger one is pure white 1 3-10 in. long and quite narrow, and the other, except for one white corner, is a beautiful dark red, not quite an inch long and a little broader proportionately.

The body of the skeleton and the lower extremities lay at a depth of 3 ft. 1 in., and the thorax at 2 ft. 9 or 10 in., the whole extending in a direction N. W. to S. E., nearly parallel with and nearly below the pavement. The right patella and part of the bones of the right foot were displaced, probably due to the burrowing of rodents.

STONE GRAVE VII, PORTAGE, ILL.

The skeleton is that of a man well advanced in years, whose height would have been 5 ft. 6 or 8 in. The feet and hands were small.

The skull was not crushed, but the pressure of earth above had driven the upper jaw down within the lower jaw. There were no very remarkable osteological malformations. The cartilaginous portion of the first rib on either side had ossified, and was attached wing-like to the sterum. A piece of thin, flat bone, found beneath the right fifth rib, was probably ossified costal cartilage.

High up, within the abdominal cavity, at a depth of 2 ft. 7 in., we came upon a small pot or jar, 3¾ in. high, and 4½ in. wide in the bowl, and 2⅞ in. at the neck, with a half-flaring lip. It is this jar, as well as the manner of burial, which stamps this grave as unique in the district. It stood in the grave right-side up, with the ears placed diagonally across the grave, *i. e.*, east and west, filled with yellow earth and fragments of charcoal. The circular spot of charcoal previously mentioned would have been just to the west of this jar, but it had been removed on the previous day. The material of which the jar is made, as ascertained at the square perforation in the bottom, is clay tempered with pounded shell, 5-16 in. thick, and it is so well

burned as to ring when struck or handled. The shape is uncommonly graceful although the ornamentation is not quite accurately spaced, and does not carry to quite the same point in the design beneath each ear. The color is pink or light red; the surface is scaled off in several places and the bottom and west half were smoked black previous to the perforating, or "killing" of the jar, as the edges of the fracture are perfectly clean and free from smut. This perforation will be conceded an interesting feature, and, as we have said,stamps this grave as unique in the district, so far as known.

GRAVE V

Especial attention is invited to a consideration of the singular conditions found at this grave, and similar graves on these terminal knolls, therefore no apology is needed for incorporating here such details of the original investigation as seems to be required for a proper understanding of these seemingly jumbled heaps of stone and bone.

One of the heaps has no stone covering, and, perhaps, belongs to another period, although the mode of interment is somewhat similar.

There were no indications on the surface here whatever of the puzzling mass of stone and bone concealed below, and the burials were only located by trenching from Grave II, although many of the stones were but 4 to 6 in. below the sod and rested frequently in contact with the bones which they had crushed. There were 2 and 3 tiers or layers of slabs here, with part of the skeletons under and between them, with no attempt at an orderly arrangement. Necessarily the bones were crushed and scattered, but aside from this there were abundant indications of injuries received previous to interment, perhaps in removing them from temporary scaffolds or graves. We found that parts of some skeletons lay in natural sequence, showing that some of the ligaments still held at the final interment, while other portions were widely scattered in great disorder.

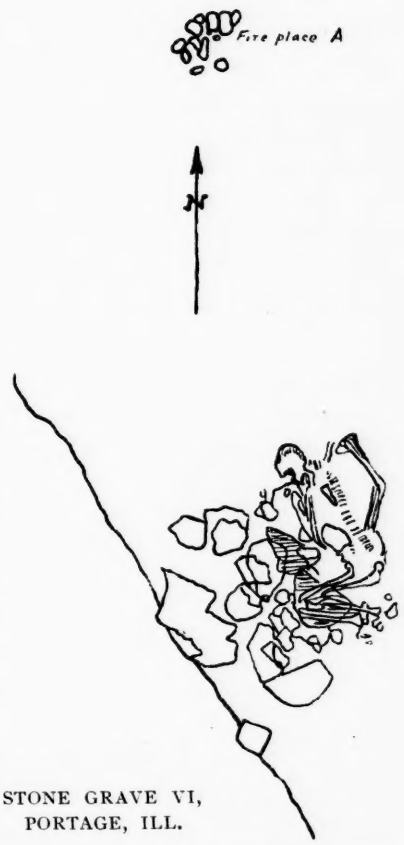
Parts of 3 skeletons were found in each heap, making a total of 9 for Grave V. Many of the stone slabs were 4 to 6 in. thick, and could have been brought here only at considerable labor, from the foot of the cliff.

Not all of these graves presented the same, nor even an approach to the disorder seen in Grave V. Grave I was a shallow burial and contained the fragile bones of an infant, and Grave III, on the eastern ridge, contained a deeper interment of an infant skeleton, with a fragment of deer antler, covered by a large heap of well-laid stones, none of which were in contact with the skeleton. Grave VI contained also one of these deeper burials, an adult skeleton in fair condition, except for some fractures, with none of the stones in contact with the bones. The stone covering here lay mainly southwest of the skeleton, that is, down the slope, and consisted for the most part of smaller and

more angular blocks of limestone than those of Grave V. Few of the stones were in contact, one with another, but lay more scattered through the earth, quite to the edge of the quarry face, which falls here sheer to the base of the cliff. North of Grave VI was a little bed of "fire stones," like those found near Grave V.

Grave VII, of which we present a photo, when the stone covering had been exposed, bore more resemblance to Grave V. Two skeletons were here huddled together, and more or less injured by the rocky covering above.

The stones here where much disintegrated, and apparently were originally unusually rough stones, much weathered, unlike those at Grave V. One large stone, lying on the bones of both skeletons, was penetrated by a natural perforation.



STONE GRAVE VI, PORTAGE, ILL.

On the outer surface of the great toe, metatarsus, of both feet of the larger skeleton are marks of some instrument, or possibly marks of teeth of animals, and the outer anterior surface of the right humerus presents a similar mark, showing striæ left by the instrument.* Other bones exhibiting similar markings are both femora, on the outer anterior surface, and in the smaller skeleton the right ulna, left humerus, and right femur. In the last-mentioned instance a transverse fracture evidently resulted, and on the reverse side a splinter of bone was chipped out by the blow, or in bending the fractured bone, much as a pine stick is sometimes splintered on the reverse side, where the saw has not made a finished cutting.

With the exception of Grave II, these graves were barren of all mortuary offerings other than the turkey bones and unio shell at Grave V, and the antler in Grave III.

The relative age of the stone-covered graves is perhaps not much less than that of the long mounds. The mode of burial is similar, and the absence of anything denoting white contact, places them, so far

*Possibly these striæ and markings are the result of rodents gnawing the bones—a common thing in such graves.

as examined, well back in time. The dry earth of the terminal knolls of both ridges is a factor toward the preservation of the remains not to be lost sight of, even when the shallowness of the burial is considered.

The stones of the Graves appear to have suffered less disintegration than stones buried in some of the round mounds, notably at Mound 16, but here again we need seek no further for an explanation than in the relative greater degree of dryness of the end of the ridge.

W. B. NICKERSON.

Chicago, Ill.

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BOOK REVIEWS

LIFE IN THE HOMERIC AGE*

PROFESSOR SEYMOUR'S volume on *Life in the Homeric Age,* published last autumn, forms a most fitting climax to his lifework, and will be a lasting monument. It is, indeed, fortunate that he was able to thus sum up his investigations in such a volume, and see it safely through the press before his death.

Professor Seymour does not intend this volume as a study of the origin of the Greeks, or their civilization, or the relation of the Greek to the Roman gods, for he does not consider that Homer wrote his epics for the benefit of the archæologists, or with any intention of conveying archæological information, nor does he even consider them as partaking of the nature of an historical novel. He does think, however, that there is much of archæology to be gathered from these poems by careful analysis. And surely no one was better fitted to make such an analysis and draw conclusions than he. Considering the poems from this standpoint, it becomes evident that Homer's failure to mention a custom does not prove that such did not exist, or was purposely omitted by him. "But," he says, "where the poet directly mentions an object or a custom, we may believe this to have been known and somewhat familiar to the Greeks of his own day, unless other evidence appear (and none has appeared as yet) to the contrary. But though the poet endeavored to depict the manners and life of his time, he may not have cared, or, indeed, have been able, so to revise all the allusions to earlier customs in the poetic material which he used, as to make it agree exactly with later usages. So, in-

**Life in the Homeric Age*, by Thomas Day Seymour. pp. xvi, 704. Maps and illustrations. The Macmillan Company, 1907.

dications of earlier manners of life still might remain. Even the wanderings of Odysseus have archæological value as presenting in the main such a view of the regions beyond the actual knowledge of the Greeks of the poet's time as might readily be formed on the basis of the stories of Phœnician sailors and traders. The accounts of the short nights of the Læstrygonians and the unending nights of the Cimmerians may have come not by sea but by land, together with amber, over a trade route from the Baltic, but this does not alter the principle."

In general, however, Homer's picture of the life of his age is the "earliest account extant of the culture from which our own is a true lineal descendant," and hence of special interest.

Homer's knowledge of geography was limited and references outside of Greece are, as a rule, very vague. As to the "pre-Hellenic inhabitants of Greece, Homer says nothing distinctly."

Professor Seymour discusses the various sites supposed to be that of classic Ithaca, and, following Doctor Dörpfeld, rather favors Leucas as the site; however, he admits that the archæological excavations, although they prove the site to have been inhabited in pre-Doric times, yet do not prove the identity of the site of Leucas with the Ithaca of Odysseus.

After discussing these more general subjects, Professor Seymour takes up the private, public, and social life, which receives more light from the epics. The state he considers as "primitive," but "not barbarous."

One most interesting chapter is devoted to Women and the Family, Education, and Recreation. One point brought out is that the Homeric women were not secluded. Of educational institutions, there appears to have been one, *i. e.*, the "boarding school," conducted by the centaur, Chiron, situated on Mt. Pelion, where the Achæan youths were trained as warriors.

Space will not permit the mentioning of the innumerable interesting and suggestive points brought out in his chapters on: Dress and Decoration, House and Furniture, Homeric Food, Homeric Property, Slavery, Trade, Sea Life and Ships, Agriculture, Plants and Trees, Animals, Olympus and the Gods, Hades, Temples, Worship and Divination, The Troad, Homeric Wars and Arms.

An idea as to the enormous amount of material gathered in this book is given by the foregoing innumeration of the chapters. It is a book of interest to every one who has the slightest classical knowledge, while with its Bibliography, English, and Greek index, it is of great value as a book of reference for all classical students.

FREDERICK B. WRIGHT.

LINCOLN IN THE TELEGRAPH OFFICE*

This attractive volume furnishes an interesting account of Lincoln as he appeared to the members of the War Department Telegraph Office staff, from 1861 to 1865. The author was on the staff during the whole time and writes from his diary and the official copies of telegrams sent, as well as from recollection. Lincoln was always deeply interested in the work of this office. There it was that he learned the latest news from the front. There he spent many hours while the cipher-operators were working on dispatches, both those from Union generals and those of Confederates, which had been intercepted. In this room the President was less liable to interruption than elsewhere, so it happened that he wrote the first draft of the Emancipation Proclamation while sitting at the desk of the chief of the office. The tension was relaxed and the telegraph corps saw him in his every-day humor, showing his love for his children and his kindly, charitable disposition.

HISTORY OF ANCIENT CIVILIZATION.** HISTORY OF MEDIAEVAL AND MODERN CIVILIZATION***

The *Historie de la Civilisation,* by M. Charles Seignobos, which proved so acceptable to school teachers in France, has been translated by Prof. Arthur H. Wilde, of Northwestern University. Two of the three volumes have already appeared, while the third is now in press. The first volume is on Ancient Civilization, the second on Mediæval and Modern Civilization, and the third will be on Contemporary Civilization. Regarding the material used, Professor James says in his introductory note: "In some particulars the work is not merely a translation. Phrases here and there not regarded as essential to an understanding of the text have been omitted. The tables of contents have been made more usable. An index has been added to each volume, and a general bibliography has been prepared for each period."

These volumes, which are especially reliable and concise, make a valuable and substantial addition to our text-books on history.

**Lincoln in the Telegraph Office*, by David Homer Bates. Illustrated. pp. 432. $2.00 net. The Century Co., 1907. New York.

***History of Ancient Civilization,* by Charles Seignobos. Translated and edited by Arthur H. Wilde, pp. xv, 373. $1.25 net. New York: Charles Scribner's Sons, 1906.

****History of Mediæval and Modern Civilization,* by Charles Seignobos. Translation edited by James A. James, pp. xi, 438. $1.25 net. New York: Charles Scribner's Sons, 1907.

EDITORIAL NOTES

BARROW AT CHAPEL CARN BREA, CORNWALL.—In August, 1907, a barrow at Chapel Carn Brea, Cornwall, was opened. It contained a cist built of flat-faced, irregular stones, with a capstone. A large urn, containing partly calcined bones, was found, as well as flint-flakes of older date than the urn. Above the cist at the north end a smaller urn was discovered.

ORIGIN OF THE GREEK TEMPLE.—Mr. P. Sarasin traces the origin of the Greek temple from a primitive house, raised on piles, such as is common in the Celebes. The periteros represents the outer row of piles, while the naos is formed by enclosing the inner row. The original dwelling has shrunk to the merely ornamental pediment and entablature. The triglyphs occupy the place of windows.

PLANS TO INVESTIGATE PRE-HISTORIC REMAINS IN WALES.—A committee composed of professors in various British universities has been formed for the purpose of thoroughly investigating Roman and pre-historic remains in Wales, in order to form a basis for writing a complete history of the Celtic people. Various tumuli and ancient fortifications in Wales will be the first subject attacked.

MODEL OF ROME DURING THE EMPIRE.—Professor Marcelliani has set up in his studio, near the entrance to the Roman Forum, a plaster model of the 5 central regions of Rome, as they were in the time of the emperors. No pains have been spared to make the model as historically accurate as possible. This will enable the visitor to gain an idea of the topography of ancient Rome more easily and completely than in any other way.

ANCIENT BURIALS NEAR BATH, ENGLAND.—During May and September, 1907, Mr. Gerald Grey and Mr. T. S. Bust discovered on Lansdown an old building, and near by 68 Roman coins, including one silver one of Julian, the Apostate. Two skeletons were found buried without coffins, but with the rock cut away to form rude sarcophagi. One of these was buried face down, with a stone over the head. A third was found in a perfect stone coffin, with a cover of stone, in two parts. In the building were found curiously shaped stones, which were moulds from metal castings.

ANCIENT REMAINS AT BROADSTAIRS, ENGLAND.—At Broadstairs, England, while excavating for a drainage shaft, a pit 12 ft. deep, 12 ft. long, and 4 ft. wide was found. The ends were slightly curved; the top was only 3 ft. below the surface. In the floor,

which appeared to be of burned clay, a much oxidized, iron spearhead, about a foot long, was found. Near by were bones of domestic animals and broken pottery. One bowl, 10 in. in diameter, has been partially restored. The type of pottery is rude. Some pieces are interesting because of the decoration of finger-nail design upon them.

FAKE ARCHÆOLOGY.—During the past few months the Wisconsin Archæological Society and the Detroit Museum of Art have been exposing the fraud of certain Detroit dealers in antiquities who have sold to collectors all over the country not only supposed Indian relics, but such things as the "Diary of Noah," and a drawing of the tower of Babel, found, it was said, in Michigan. Their method seems to have been something like this: Copper objects, clay pipes, etc., were made and then buried. After a sufficient length of time had elapsed for the earth to become packed down again, these relic hunters discovered them without much trouble, perhaps in the presence of uninitiated witnesses. This kind of archæology they have been carrying on for about 15 years. The two societies mentioned deserve the thanks of all interested in archæology for exposing this fraud and so putting all on guard against such impostors.

METHODS OF EMBALMING.—In a paper published in a recent report of the *Institut Egyptien,* Dr. G. Elliot Smith gives an interesting account of Egyptian methods of embalming as he has been able to reconstruct them from his extended study of mummies. The earliest method, that of 7,000 years ago, was a sun-drying process, which has preserved the bodies until the present. Later there were many changes. From the XVIII to the XX dynasties a new practise was initiated, that is, an attempt to restore to the shrunken limbs the form which had been lost during the early stages of embalming. This they tried to do by packing under the skin and in the cavities linen, sawdust, sand, and other materials. The brain and organs of the thorax, with the exception of the heart, were removed, cleansed, and dried. Then the collapsed body was packed. Mud was poured into the neck through the thorax, and wedged in with linen. In one case, which Doctor Smith noted, fine leather had been sewn to the healthy skin of a woman to hide some wounds. Artificial eyes were placed in the sockets; sometimes these were formed of linen, with black spots for pupils, and sometimes of onions. The dried viscera were wrapped in neat parcels, with the wax image of the prescribed god for each, and then returned to the body. As few incisions as possible were made. These were sometimes stitched up with a running thread. The aperture in the flank was covered with a wax or bronze plate, bearing the symbol of the sacred eye. The men were painted red and the women yellow. The eyebrows were tinted black.

PIT-DWELLINGS NEAR SADDLESCOMBE, ENGLAND.—Mr. Ernest Robinson, while excavating for flints, near Saddlescombe, England, discovered pre-historic pit-dwellings with clay hearths. The flints had evidently been removed from the land in the course of plowing, and thrown into the pits. Charcoal, ashes and clay hearths led to the conclusion that the pits were pre-historic dwellings. The only worked flints found were hammer-stones and an implement of kitchen-midden form, adapted for excavating. Accompanying these were half of a perforated granite hammer and fragments of coarse, hand-made pottery of the Bronze Age type. The pits faced east, probably for protection from the southwest winds. A Roman coin of A. D. 141 was found near by. Teeth and portions of a human skull, oyster-shells, and fragments of lathe-turned Romano-British pottery were also found. Many shells of land snails and mole bones, as well as bones of cattle and tusks of wild boars, were not far away. A peculiarity of these pit-dwellings is that the hearth was inside the pit, not outside. It is thought that the pit-dwellings belong to the Bronze Age and that the same sites were subsequently occupied by Romano-British tribes. Nearly all these pre-historic camping-grounds were confined to those portions of the hills capped by "clay with flints," possibly because of the presence of the clay for use in making pottery and for plastering the roofs made of boughs.

WEATHER WORDS OF POLYNESIA.—William Churchill, in a recent memoir of the American Anthropological Association, has collected the various "Weather Words" of the Polynesian Islanders, and from these has drawn a number of interesting conclusions. It seems that in Polynesia everything came from the sky and the "genealogy" of the "cosmic marriages" bears this out. The first seven generations are of special interest, and are as follows:

"Rock-gliding wedded Rock-sitting, begat Rock-erect.

"Rock-erect wedded Rock-in-earth, begat Glebe.

"Glebe wedded Wind-above, begat High-wind and Boisterous-wind, and Wind-smiting-lands and Gentle-wind and Dew-of-life.

"Dew-of-life wedded Cloud-clinging-to-the-sky, begat Flying-cloud.

"Flying-cloud wedded Vault-of-sky, begat Break-of-day, Morning-twilight, Dawn, Forenoon, High-noon, Westering-sun, and Glory-of-sunset.

"Gentle-wind wedded Scud-flying-in-the-void, begat Empty-sky.

"Empty-sky wedded Expanse-of-sky, begat Tangaloa-creator-of-families.

A study of the words meaning fire, heat, comfort, etc., indicate a migration from a colder climate, for in a region where the temperature seldom goes below 70° to warm, would scarcely mean to comfort unless the word had its origin in a land where fire was a comfort instead of a necessity, which they kept as far as possible from their habitations.

There is but one explanation possible. So far as the backward of the known Polynesian migration into these seas can be traced from their records upon our charts, we are led closer and closer to the equator, nearer and nearer to yet

greater warmth. But behind the warmth, in a track of migration wherein we have no sure tradition to guide us in orienting the early steps of the prehistoric fathers of this race, we are led unerringly to some land where the warmth of a fire gave them comfort, some land of keen and eager air, some land where the climate was far different from the climate of the heated islands on which we now find the race established. Whether the cold their ancestors knew was the frost of altitude, or low temperature of latitude, we perhaps may never have the data to determine. Percy Smith, from a keen examination of one of the old race names, Avaiki-te-Varinga, has pronounced them an ancient Gangetic people. This may well be the case, yet so long as warmth and comfort are the same word on Polynesian tongues, we may be pardoned for looking upon the sun-baked valley of India's holy river as but a halting place, not the home land. Along independent lines of research Tregear has been led to a cradle of the race in the spurs of the Hindu-Kush. That is a theory which will fit in well with this *mahana* revelation of the past, yet it may not accord so well with other lines of investigation. So far as concerns the present paper, we may rest upon the statement that any nursery of the first Polynesians in their distant and infant estate must be identified as a land whose temperature at times must fall so low that the heat of the fire must prove grateful to man, that the comfort of the chilled body must be so marked as to provide the name for the comfort of the soul. This must have been so marked by climatic contrast and continued over such a long period of time that the swarming race had of necessity to carry the idea and the words with them to the blazing equator and their new homes which dot the warm seas.

DEATH OF THEODORE F. WRIGHT.—We are pained to report the sudden death of Rev. Theodore F. Wright, Ph.D., the Honorary Secretary of the Palestine Exploration Fund for the United States, whose monthly notes on the progress of the work of that society have been so interesting and acceptable to our readers. Mr. Wright was on his way to Palestine, and had just left Alexandria. A telegram announced his death on November 13, 1907. After leaving Naples he realized that he was unequal to the journey up the Nile and to Palestine, and was anxious to get home. He expired a few hours after leaving Alexandria, on the return voyage. "He was so able, so zealous, and so kindly a representative of the Fund, that his loss seems almost irreparable. By his ability and tact the American support of the work of the Palestine Exploration Fund had greatly widened and increased, and he never spared himself in promoting an interest in its objects."

We hope in our next issue to give a fuller notice of his life and work.

Miss Mary A. Wright, sister of the late Honorary Secretary, of the same address, has kindly consented to act as Honorary Secretary in the United States of America for the present, and is so authorized by the committee.